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The Second Wisconsin-Michigan Boundary Case in the Supreme Court of the United States, 1932-1936[1]

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"Questions of territorial jurisdiction in respect of fishing constitute the occasion of the present controversy. And it confidently may be assumed that when fixing the boundary lines in the waters of the bay Congress intended that Michigan and the State to be erected out of Wisconsin Territory should have equality of right and opportunity in respect of these waters, including navigation, fishing and other uses" [from opinion by Mr. Justice Butler of the Supreme Court, May 20, 1935].

CONTENTS

[1] Messrs. Hunter Miller and S. W. Boggs of the Department of State, Prof. Robert S. Platt of the University of Chicago, and President Isaiah Bowman of the Johns Hopkins University, have kindly advised the author concerning certain details in this paper.

INTRODUCTION

This paper might possibly be called "The Association of American Geographers *versus* the Supreme Court of the United States" since, as a direct outcome of the publication of the presidential address delivered before the Association of American Geographers at Columbus, Ohio, on December 30, 1929, a new boundary suit between the States of Michigan and Wisconsin was brought and heard between 1932 and 1936, resulting in the striking out of Green Bay and lower Menominee River boundary provisions of a previous decree of the Supreme Court.[2]

In that paper it was pointed out that six islands in Green Bay, half of another island, and a small part of the mainland of the Upper Peninsula of Michigan, which were not in dispute in the previous boundary case and which had always been administered by the State of Michigan, had been awarded to the State of Wisconsin. It was also shown that Wisconsin was awarded Sugar Island in the Menominee River (Fig. 1), a part of the city and county of Menominee, Mich., upon which the county collected taxes to the amount of $35,000.00 annually, as well as half of Grassy Island, and that three islets nearby were given a dubious status. Moreover an expanse of about 421 square miles in the waters of Green Bay, including valuable fishing grounds, was awarded to Wisconsin by the 1926 decree of the Supreme Court, although it is clear that the intention of the court was to award these waters to Michigan. The same thing was true with respect to more than 291 square miles of the waters of Lake Michigan.

These and other errors seemingly arose because the attorneys connected with the case drew up and submitted to the Supreme Court a form of decree agreed upon by them as embodying the conclusion of the court's opinion. Among other unfortunate provisions that decree contained the words "north by east" in one of the courses of the boundary description when the word "northeast" was obviously intended (Fig. 2), and it was erroneously assumed that certain land sections in specific townships had been formally

[2] "The Michigan-Wisconsin Boundary Case in the Supreme Court of the United States, 1923–26," *Annals Assoc. Amer. Geographers*, Vol. 20, 1930, pp. 105–163; see also "Wisconsin-Michigan Boundary in Relation to Rivers and Lakes," *Bull. 36, Wis. Geol. and Nat. Hist. Survey*, second edition, 1932, pp. 422–427, and the Supreme Court's decisions in *270 U. S. 295; 70 L. Ed. 595; 46 Sup. Ct. Rep. 290; 272 U. S. 398; 71 L. Ed. 315; 47 Sup. Ct. Rep. 114.*

divided into lots. The presidential address also pointed out that the division of fishing waters was by no means fair to the fishermen using them, and that specified shoals, as well as lighted buoys and other familiar aids to navigation, might well be used as turning points in a revised boundary.

The day after the reading of this address the *Ohio State Journal* published a reasonably accurate abstract concerning the matter, including the following entertaining statements:

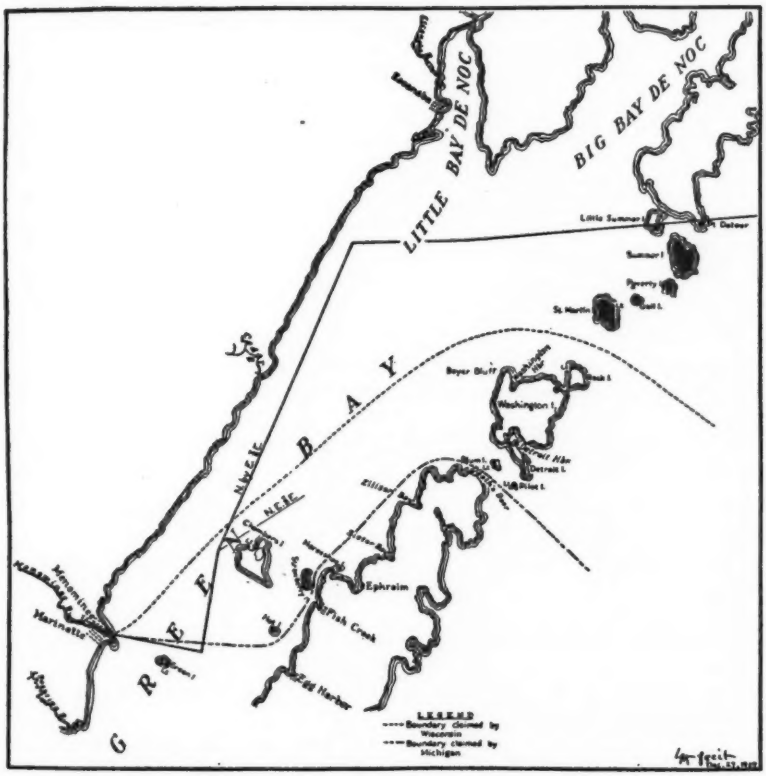


Fig. 2.—The area involved in the Wisconsin-Michigan boundary case of 1932–36. The full line is the boundary fixed by the Supreme Court in 1926; the dashed line is the boundary claimed by Wisconsin in 1923; the line of long and short dashes is the boundary claimed by Michigan in the same year; the islands and mainland area colored black were awarded to Wisconsin though she did not claim them; the angle between the labelled solid lines northwest of Chambers Island shows the difference between a boundary course extending *northeast* and one extending *north by east*.

"Hundreds of uninformed souls living in 4255 acres of what they supposed to be Michigan, for three years have been paying taxes to the wrong state, placing the wrong colored license plates on their cars and yelling for the wrong football team.

"Their money should, according to a strict and literal construction of a U. S. Supreme Court decree of 1926, have gone to the coffers of Wisconsin, and their football songs should have inspired the warring ranks of the Badgers, not the Wolverines.

"They do not know this; less than half a dozen persons in the world knew it until Monday night, when it was revealed to the Association of American Geographers, meeting in Columbus this week . . ." (*loc. cit.*, Dec. 31, 1929).

In view of the fact that the half dozen persons referred to above included the special assistant of the Attorney General of Michigan who prepared and argued the Michigan-Wisconsin boundary case of 1923–26, the writer was surprised to receive the following letter from the Hon. Wilbur M. Brucker, Attorney General of Michigan and subsequently its Governor, dated Jan. 2, 1930:

"A newspaper clipping from the Grand Rapids, Michigan, Press under date of January 1st, contains an article stating that at the American Geographers Convention at Columbus, Ohio, on January 1st, you discussed the matter of the Michigan-Wisconsin Boundary and stated that through error in the 1926 decree, the boundary was stated 'north by east seven-eighths, 27 miles,' etc.

"I would appreciate receiving word from you as to what you have found the situation to be. If a mistake has been made it should be now corrected instead of letting posterity bear the burden of an error which would be difficult to correct in the days to come."

The article referred to by the Attorney General of Michigan reads as follows.

"Geographer Says Michigan Has 4,255 Acres Really Wisconsin's Through Error in 1926 Decree

"Columbus, O., Jan. 1—(AP)—Michigan and Wisconsin have another boundary dispute to settle.

"An area comprising 4,255 acres of land and 707 square miles of water generally considered a part of Michigan, in reality belong to Wisconsin, in the opinion of [the] president of the Association of American Geographers, in convention here.

"The territory in question was retained by Michigan in 1926 when the United States Supreme Court handed down a decree assumed to have settled the long-standing dispute between the two states.

"But, according to [the geographer], the erroneous use of the word 'by' in the decree describing the boundary through Green [Bay]

from a point two miles west of the Chambers island lighthouse, 'north by east seven-eighths, 27 miles thence,' technically transferred the area to Wisconsin. This, he said, is the literal construction of the decree.

"[He] expressed the belief that attorneys who prepared the decree for the Supreme Court meant to write 'northeast,' and since the territory had not been involved in the dispute, it continued to be a part of Michigan as a matter of custom. No one . . . took the trouble to examine this clause of the decree with special care and the mistake never was noted" (*Grand Rapids Press,* Jan. 1, 1930).

The mistakes were not all in favor of Wisconsin for the Supreme Court had awarded to the State of Michigan in 1926 a triangular area of some 33 square miles of water in Green Bay opposite the cities of Menominee, Mich., and Marinette, Wis. Here the fishermen of both States, it appears, had been wont to ply their trade, regardless of knowledge as to the position of the State boundary. Shortly after the Columbus meeting of the Association of American Geographers, Michigan officials took steps to limit fishing here. In February, 1930, the *Milwaukee Sentinel* made the following statements:

"Marinette, Feb. 7. Marinette fishermen who had nets in Michigan territory are busy hauling them out again.

"They have to be out by Sunday, the authorities state. The field involved is one of the most fertile in the bay and the withdrawal of the nets will prove a serious loss to the Wisconsin fishermen. Michigan licenses are necessary to fish within the outlined boundaries, an order by Michigan conservation commission said" [*loc. cit.,* Feb. 8, 1930].

"Menominee, Feb. 12. Michigan conservation officers headed by Charles J. Allen, Cheboygan, Mich., field supervisor of commercial fishing, Wednesday patrolled the disputed thirty-five square miles of Green bay waters in Lake Michigan off Marinette, Wis., pending a hearing in Chicago Friday over the Michigan-Wisconsin boundary dispute.

"Wisconsin fishermen Monday were advised to pull their nets awaiting the decision of the Chicago conference.

"Wisconsin fishermen claim Michigan was awarded the disputed waters through a technical error in a United States Supreme Court ruling" (*loc. cit.,* Feb. 13, 1930).

The next stage in the attempt to clarify the boundary situation is indicated by the following quotations from a Wisconsin newspaper:

"Chicago, Feb. 14. A dispute over the Michigan-Wisconsin boundary in Green Bay reached an 'acute' stage at a conference here on Friday and the attorneys general of the two states telegraphed the clerk of the Supreme Court at Washington, D. C., requesting a meet-

ing with Associate Justice George Sutherland on Feb. 19. Justice Sutherland wrote an opinion and decree in the controversy in 1926.

"Attorneys, boundary commissioners and representatives of the conservation departments of Wisconsin and Michigan had debated the merits of their boundary claims throughout the morning without approaching an agreement. The rights of Wisconsin fishermen to set their nets in the waters of Green Bay north and east of Menominee exempt from the Michigan fishing license fees were the immediate stake.

"Failing to attain a settlement, Atty. Gen. Wilber M. Brucker, of Michigan, and John W. Reynolds, of Wisconsin, telegraphed to Washington for a hearing before Justice Sutherland. They asked the clerk to fix a date if Feb. 19 was unsuitable, and returned to conference to await a reply.

"A decision by Sutherland in November, 1926, upheld Michigan's contention but a decree on the same question, upheld by Justice Sutherland in the same year is interpreted by Wisconsin to qualify his previous decision inasmuch as the word "by" inserted by appealing attorneys between "north" and "east" alters the boundary line completely.

"It brings the line very close to the Michigan shore and gives Michigan [*i.e.*, gives Wisconsin] Summer island, Poverty island and St. Martin's island. These islands, Wisconsin says, it cannot legally claim. Rock island and Washington island lying in undisputed waters, are classified as Wisconsin soil.

"Atty. Gen. Brucker Friday seemed disposed to settle the matter without recourse to the Supreme court but Wisconsin officials declared that, rather than concede the rich fishing grounds in the disputed area to Michigan, it would ask the Supreme court to review the entire affair and issue a decree correct in all particulars.

"The Wisconsin fishermen said they paid a license fee of $1.00 on each lineal feet of net used by them. Their minimum nettage, they said, was approximately 2,000 feet and their maximum 180,000 feet.

"It was unfair, they contended, for Michigan to impose only a $10 fee on its resident fishermen irrespective of the amount of net used, and yet attempt to collect a $200 non-resident fee from the Wisconsinites" (*Milwaukee Sentinel,* Feb. 15, 1930).

It is understood that Messrs. Meredith P. Sawyer and Hugh A. Minahan, representatives of the Attorneys General of Michigan and of Wisconsin, respectively, discussed the situation with Mr. Justice Sutherland of the Supreme Court on Feb. 21, 1930, and that, early in 1931, the Attorney General of Wisconsin attempted to come to an agreement with the Attorney General of Michigan concerning a joint request to the Supreme Court asking for modification of the boundary decree of 1926 without litigation. These praiseworthy attempts having failed, a new suit was brought in the Supreme Court.

In the former suit the State of Michigan was the plaintiff. In the second suit the State of Wisconsin assumed that rôle. Suit was filed on November 7, 1932. The former boundary suit had to do with the whole northern boundary of Wisconsin. The second suit concerned itself only with the State boundary in the lower waters of the Menominee River, in Green Bay, and in upper Lake Michigan.

That Wisconsin should have been the plaintiff in the new case and should have asked the Supreme Court to restore to Michigan the six and one-half islands in Green Bay and the highly taxable Sugar Island in the Menominee River which the court had given Wisconsin in 1926 is an interesting phenomenon. It indicates the neighborly relations that exist between the States of the Union. One other factor entered into the situation, however. There was, as stated above, a triangular area of some 33 square miles in Green Bay which the 1926 decree of the Supreme Court gave to Michigan and here the fishermen from Marinette, Wis., as well as the fishermen from Menominee, Mich., were accustomed to reap their finny harvest. It might be said that a publication by one of the members of the Association of American Geographers loaded the gun for a new lawsuit and that this triangle of fishing waters pulled the trigger.

HISTORY OF THE PRESENT CONTROVERSY

Since the matter must be referred to later in connection with one of the major problems in this case, it may interest members of the Association to know that the boundary proposed by Wisconsin in the 1932 bill of complaint was one furnished, at her Attorney General's request, by a geographer.[3]

[3] *Editor's Note.*—Obviously the "geographer" referred to upon this and several subsequent pages is Lawrence Martin, the author of this paper. In his desire to steer between the Scylla of appearing immodest and the Charybdis of writing an incomplete account of this colorful boundary dispute he has not only referred to himself exclusively in the text as "a geographer" but has also failed to tell his readers that, in this case, he was an expert witness before the Supreme Court's Special Master, retained, while on leave of absence without pay, by the Attorney General of Wisconsin. During the progress of the case I understand that he also advised the Special Master and, as is pleasant to record, the Attorney General of Michigan upon several occasions when one or the other of these gentlemen consulted him. It is easy to surmise that he never divulged the confidence of one of these three persons to either of the other two. It should also be recorded that the author is not unacquainted with the geography of boundary litigation, having been an expert witness in earlier lawsuits, including the boundary disputes between Wisconsin and Minnesota, New Jersey and Delaware, and Virginia and the District of Columbia; he had much to do with the Guatemala-Honduras boundary arbitration, with President Wilson's Armenian boundary arbitration, with the arbitration concerning the Island of Palmas which was claimed both by the United States as a Philippine Island and

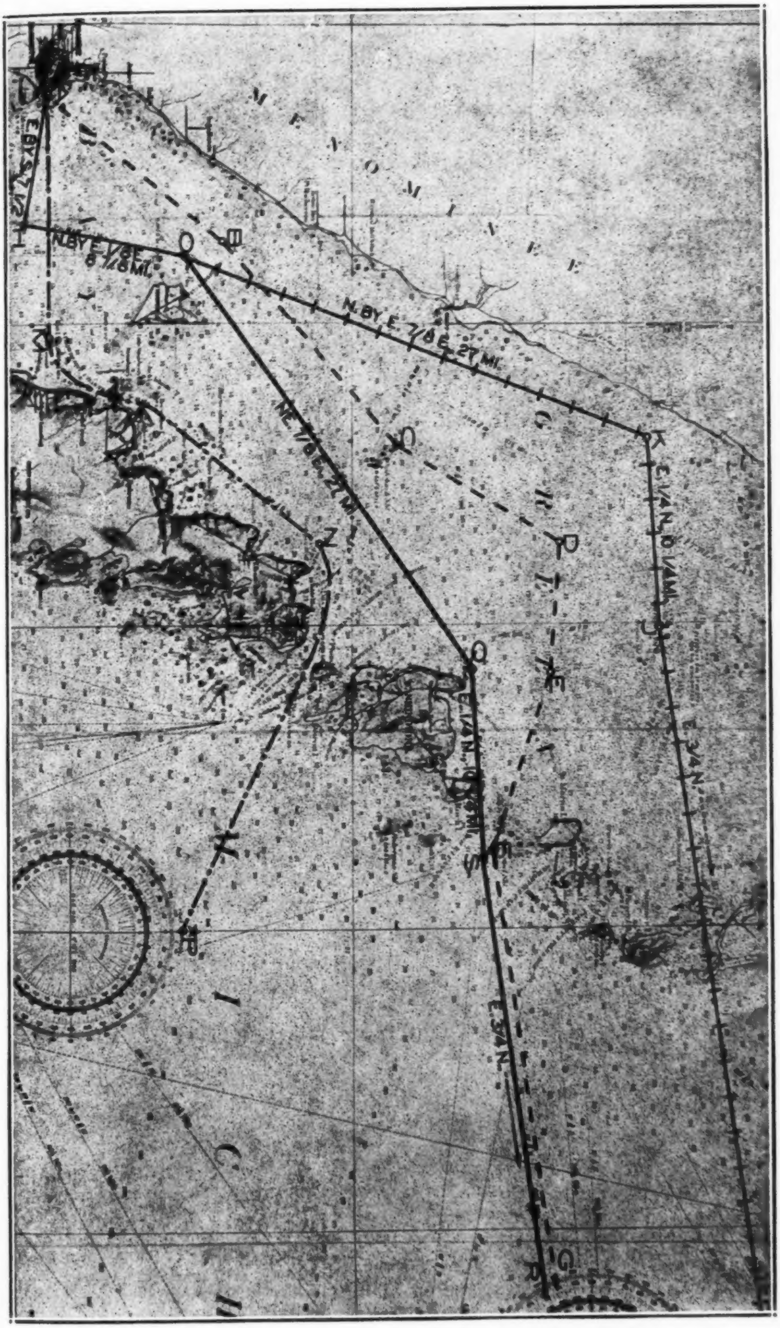
This is shown by the following table.

Boundary turning points suggested by a member of the Association of American Geographers, at the request of the Attorney General of Wisconsin, on Sept. 16, 1931.	*Boundary proposed by the Attorney General of Wisconsin to the Supreme Court of the United States in October, 1932 (Petition for Leave to File Bill of Complaint, page 33)*
"the outer end of the piers at Menominee	"to the outer end of the piers at Menominee being the centre of the harbor entrance of said Menominee River, thence in a direct line to
"a point half way from Chambers Island to the Michigan mainland	"a point half-way from Chambers Island to the Michigan mainland measured from the water's edge at the narrowest channel; thence in a direct line to
"the west end of the Whaleback Shoal	"the west end of the Whaleback Shoal thence in a direct line to
"a point half way from Boyer's Bluff to the Michigan mainland at the mouth of Bark River	"a point half-way from the water's edge adjacent to Boyer's Bluff to the water's edge on the Michigan mainland at the mouth of Bark River; thence in a direct line to
"a point half way from Boyer's Bluff to Driscoll Shoal	"a point half-way from the water's edge at Boyer's Bluff to Driscoll Shoal; thence in a direct line to
"the light on St. Martin Shoal	"the light on St. Martin's Shoal; thence
"the middle of Lake Michigan southeasterly of St. Martin Shoal"	"east three-quarters north to the boundary between the State of Michigan and the State of Wisconsin in the middle of Lake Michigan"

Michigan on her part proposed in 1932 that the new boundary decree should merely correct the old one by omitting the word "by" from the boundary course in the Supreme Court's 1926 decree which reads "north by east seven-eighths east 27 miles." The difference between the two proposed boundaries was as follows (Fig. 3). Though both provided that

by The Netherlands as a part of the Dutch East Indies, and with the so-called Great Lakes Level Case or Chicago Sanitary District Case in which the Hon. Charles Evans Hughes was the Special Master. At the request of the Editor of the *Annals* the author has limited this paper to a narrative of representative problems, significant pieces of evidence, and important arguments. It would have been impossible to have provided space for a *précis* of all problems, all evidence, and all arguments in this voluminous and complicated case.

FIG. 3.—The dashed line A B C D E F G is Wisconsin's boundary claim 1932–36; the full line A H O Q S R is Michigan's claim; the southernmost line is Michigan's claim in the older boundary suit 1923–26; the northernmost line is the boundary set up by the Supreme Court in 1926.


MENOMINEE
N.BY E.1/8 E. 6 1/8 MI.
N.BY E. 7/8 E. 27 MI.
NE.7/8 E. 21 MI.
E.3/4 N.

the six and one-half islands in Green Bay and the small portion of the Upper Peninsula of Michigan should be restored to that State, the Wisconsin proposal divided the waters of the bay somewhat equally while the Michigan proposal held the boundary so close to Rock Island, Washington Island, and Chambers Island that Wisconsin fishermen would have had to take out expensive Michigan licenses in order to go as much as a quarter of a mile off-shore with their nets at Rock Island, half a mile at Washington Island, and a little over one mile at Chambers Island. Michigan fishermen could operate 3, 6, and 17 miles off-shore without obtaining the less expensive Wisconsin licenses. Both States agreed that Sugar Island and the Wisconsin half of Grassy Island should revert to Michigan. With respect to the triangle of fishing water off Menominee and Marinette, Wisconsin was intent on acquiring it, Michigan on retaining it. The latter State also implied that the Supreme Court could not reopen the case.

After consideration, the Supreme Court accepted the suit and, on Jan. 23, 1933, appointed a Special Master in Chancery who conducted extensive hearings, took evidence on all points at issue, and recommended a boundary. The Supreme Court then heard argument and settled the boundary in an opinion dated May 20, 1935 (*295 U. S. 455*), and a decree dated March 16, 1936 (*297 U. S. 547*), which correct the errors in the earlier decree and also divide the fishing grounds of Green Bay equitably.

The Special Master was Judge Frederick F. Faville, of Des Moines, Iowa, an eminent former Chief Justice of that State. The special counsel who prepared and argued the cases for the two States were A. J. Bieberstein, of Wisconsin, and Meredith P. Sawyer, of Michigan, each of whom assiduously gathered and ably handled the materials pertinent to the issues and the evidence presented by their States to the Special Master and to the Supreme Court. At early stages of the suit J. E. Messerschmidt acted for the Attorney General of Wisconsin and at later stages Edward A. Belitzke acted for the Attorney General of Michigan. At different times during this controversy first John W. Reynolds and then James E. Finnegan were the Attorneys General of Wisconsin, while Wilbur M. Brucker, Paul W. Voorhies, Patrick H. O'Brien, Harry S. Toy, and David H. Crowley were, in turn, the Attorneys General of Michigan.

One unusual and praiseworthy feature of the gathering of testimony for the case by Mr. Bieberstein, of Wisconsin, was the sending out of a questionnaire to fishermen and other navigators. These men usually are off on the lake by 5 A. M. They go to bed soon after sunset. It would have been impossible to get in touch with many of them by personal visits but the questionnaire reached a great number of these well-informed witnesses. Among other things the fishermen were asked their names, ages,

and occupations, whether they had fished in Green Bay waters, and if so how long, for what period they had been acquainted with navigation in Green Bay waters, whether they held Wisconsin fishing licenses and if so for how long they had held them, whether they held Michigan fishing licenses and if so for how long they had held them, how long they had been acquainted with fishing areas in Green Bay, in what fishing areas they had fished within Green Bay, with what additional areas they were acquainted and how they had become familiar with them.

A group of boundary questions followed. During your period of acquaintance with Green Bay waters and before 1926, do you know where the boundary line between Michigan and Wisconsin was generally thought to be? If you know where the boundary line was generally accepted in part of Green Bay, check places where a generally accepted boundary line is familiar to you: (a) between Rock Island and St. Martins Island, (b) between North Boyers Bluff and Driscoll Shoal, (c) between Bark River and Boyers Bluff, (d) with reference to Whaleback Shoal, (e) with reference to Chambers Island, and (f) with reference to Menominee River Harbor. In the vicinity of the places checked by you where was the boundary generally thought to be? If you can, will you trace the course of the generally accepted boundary in all that part of Green Bay familiar to you? How long to your knowledge was the boundary as stated by you generally accepted as the true boundary? If you held only Wisconsin licenses, did you fish up to this line on your Wisconsin licenses as being Wisconsin waters? If so, how often and for how many years? Did you ever see Michigan fishermen fishing on the Wisconsin side of this line on Michigan licenses? If so, how often? Did you ever see Wisconsin fishermen fishing on the Wisconsin side of this line on Wisconsin licenses only? If so, how often? Where did you secure your information as to where this line was located? When you first became acquainted with it do you know where the older fishermen and navigators on Green Bay considered the boundary line to be? Was that the same as where you have placed it? Did you ever discuss it with others, either from Michigan or Wisconsin, and if so, about how often and how long ago? How often did steamboats travel on Green Bay when you first became acquainted with it? To what port or ports did they travel? Were there any sailing vessels on Green Bay at that time? What proportion of vessels traveling on Green Bay were sailboats and what proportion powerboats?

The fishermen were asked to add any further information that they had. And, as geographers will be delighted to learn, a reduced-scale facsimile of the pertinent U. S. Lake Survey chart was sent with each questionnaire for the convenience of the fishermen who received it.

A second sagacious and delightful feature of the investigation came later. The Special Master, accompanied by counsel for Michigan and for Wisconsin, went in a large boat to the boundary sites claimed by Michigan and by Wisconsin. In various ports, such as Detroit Harbor on Washington Island, Wis., and Sister Bay on the Door Peninsula of Wisconsin, as well as at Menominee, Mich., he took the testimony of fishermen who had received the questionnaire and indicated that they were informed concerning the matters in controversy, as well as the testimony of other witnesses introduced by the special counsel for Michigan. Those witnesses were admirably selected geographically. They came from Detroit Harbor and other ports of Washington Island, from Sister Bay, Ellison Bay, Gills Rock, Menekaunee, and Marinette, Wis., and from Menominee, Ingallston, Southport River, Arthur Bay, Cedar River, and Escanaba, Mich. Plat these places upon a map. You will observe that the whole shore of the disputed waters in Green Bay produced witnesses familiar with all the area under consideration except St. Martin Island where no one lives except four light-keepers. Legal field work! Would that there were more of it in litigation where geography plays a part!

Witnesses one less than a hundred in number passed before the Special Master in 1933–34. Wisconsin introduced sixty-three, Michigan thirty-six. They were fishermen, ship masters, sailors, lawyers, lake-going law enforcement officers, patrol boat captains, lighthouse superintendents, geologists, engineers, lumber shelvers, professors, surveyors, farmers, real estate dealers, boat builders, lumber inspectors, fish culturists, storekeepers, editors, dealers in gasoline, county treasurers, civil engineers, contractors, cement workers, aldermen, laborers, railroad men, postmasters, wholesale fish dealers, and a mail carrier who operated rural free delivery in a boat.

The Icelandic derivation of many residents of Washington Island, Wis., which has a population of 784, of whom 450 are probably fishermen and 466 foreign-born or children of foreign parents, as well as the Swedish, Norwegian, or Danish elements in the population of this island and in the population of other portions of the shores of Green Bay, and of the cities of Marinette and Menekaunee, Wis., and Menominee, Mich., revealed themselves in the names of the witnesses. Out of the 99 persons testifying, no less than 26, or one out of every four, were named Ellefson, Hanson, Johnson, Gunderson, Nelson, Olsen, Olson, Peterson, Pedersen, Person, Anderson, Sorensen, Settersten, Carlson, Jacobsen, Jensen, or Larsen. The names of the witnesses Strohm, Nyland, Angwall, Ekstrom, Lindbergh, Nisen, and Bergren also smell of the northern seas. So one may safely add these seven names to the 26 and say that 33 witnesses out of the 99, or one out of every three, had Icelandic, Norwegian, Swedish, or Danish forbears; it is not reckless to conclude that the ancestors of the four Rou-

leaus and the six Williamses came from other countries. Needless to say they were all good witnesses. Unlike the Michigan-Wisconsin boundary case of 1923–26, this boundary case of 1932–36 seems to have had no witnesses who were American Indians.

The 99 witnesses included 73 fishermen. This is important for they were the men who knew, more precisely than any other local residents (a) where the water boundary was reputed to be, (b) in what fishing grounds State authorities insisted upon Michigan fishing licenses and gas boat registrations, or licenses of both States.

The exhibits introduced in evidence numbered 124. Michigan presented 31, Wisconsin 92; and these friendly opponents united in submitting "Combined Exhibit 1," a map which each witness had before him when he testified. Some of the exhibits were verbal or textual rather than cartographic. Laws, treaties, sailing directions, coast pilots, lighthouse lists, histories, and century-old letters comprised fifty of Wisconsin's exhibits and two dozen of Michigan's. One exciting exhibit was a part of the manuscript field notebook of Douglas Houghton, recording observations in Green Bay and on the Menominee River in 1839. He was a famous and beloved State Geologist of Michigan and for a time its boundary commissioner. There were maps in this notebook too, and one of them was of critical importance in the boundary suit of 1932–36. Two other exhibits, printed government documents these, were reports of Capt. T. J. Cram, an army officer who was the federal Michigan-Wisconsin boundary commissioner nearly a hundred years ago. They included half a dozen maps and one of them is reproduced in this paper (Fig. 8). Still another exhibit of a textual nature is one possessed by each member of the Association of American Geographers, at least it was so possessed in 1930; it has eight maps.

Aside from these and the other textual exhibits some sixty maps were introduced in evidence before the Special Master, two more than fifty by Wisconsin, seven by Michigan, and one by both. One likes to think that an important portion of the evidence was that derived from maps. A number of these cartographic characters in the boundary drama were interpreted, honestly, for he was under oath, by a witness who was a geographer and had made a few of the maps himself.

In all, the two States laid before the Special Master and the Supreme Court an imposing body of material. This was contained in the briefs, transcript of testimony, and exhibits listed below, including a vast amount of geographical and cartographic evidence.

(1) Affidavit of R. M. Rieser and Reply Brief of Defendant [Wisconsin] on Motion to Strike and Modify the Decree [Sept. 28, 1932]; at this time the two States evidently intended to carry on a continuation of the Michigan-Wisconsin boundary case

	pages	maps
of 1923–26 and hence Wisconsin is alluded to in this brief as the defendant	9	—
(2) [Wisconsin's] Petition for Leave to File Bill of Complaint, Bill of Complaint, and Memorandum Brief [filed Nov. 7, 1932]	42	—
(3) [Michigan's] Answer to Bill of Complaint [filed Dec. 27, 1932]	16	2
(4) [Wisconsin's] Reply to Defendant's Answer to Bill of Complaint [filed Feb. 17, 1933]	11	—
(5) Defendant's [Michigan's] Answer to Affirmative Allegations of Plaintiff's Reply [filed Mar. 11, 1933]	9	—
(6) Transcript of Testimony before Special Master (not printed as a whole)	1,663	—
(7) Exhibits Introduced before Special Master numbered 123, but only a few were printed: 52 maps introduced by Wisconsin, 7 maps by Michigan, and one combined map exhibit	—	60
(8) Wisconsin's Briefs for argument on Apr. 9–10, 1934, before Special Master [not printed]	—	—
(9) Michigan's Briefs as above [not printed]	—	—
(10) Report of the Special Master to the Supreme Court [Nov. 12, 1934]	51	1
(11) Plaintiff's [Wisconsin's] Exceptions to the Report of the Special Master, [dated Nov. 20, 1934, filed Dec. 4, 1934]	9	—
(12) Defendant's [Michigan's] Exceptions to Report of Special Master [filed Dec. 10, 1934]	14	—
(13) Brief of Plaintiff, State of Wisconsin, on Exceptions to the Report of the Special Master [dated Jan. 10, 1935, filed Jan. 19, 1935]	141	1
(14) Brief of the Defendant [State of Michigan] [filed Jan. 21, 1935]	49	—
(15) Reply Brief of Plaintiff [State of Wisconsin] on Exceptions to the Report of the Special Master [dated Jan. 30, 1935, filed Feb. 4, 1935]	22	—
(16) Reply Brief of the Defendant [State of Michigan] [filed Feb. 4, 1935]	46	—
(17) Abstract of Testimony Taken Before the Special Master Pertinent to the Exceptions to the Report of the Special Master [stipulation dated Mar. 1, but printed abstract filed Mar. 20, 1935]	132	7
(18) Brief of Plaintiff, State of Wisconsin, on Exceptions to the Report of the Special Master [also dated Jan. 10, 1935, but filed Apr. 8, 1935]	188	6
(19) Brief of the Defendant [State of Michigan] [filed Apr. 8, 1935]	75	—
(20) Supplemental Report of Special Master and Proposed Decree [filed Jan. 13, 1936]	32	2
(21) Joint Motion of Parties for Time to Settle Record, File Briefs and Settle Time for Argument on Exceptions to Special Master's Supplemental Report and Proposed Decree [signed Dec. 30, 1935, filed Jan. 2, 1936]	2	—

	pages	*maps*
(22) Abstract of Testimony and Record Made before the Special Master Pertinent to the Settlement of the Decree [dated Jan. 17, filed Jan. 27, 1936]	43	—
23) Brief in Support of Plaintiff's [Wisconsin's] Objection to Supplemental Report of Special Master [filed Feb. 17, 1936]	17	1
(24) Brief for the Defendant [State of Michigan], [dated Feb. 12, filed Feb. 19, 1936]	28	1

At one time or another some 936 pages of printed matter, 1,663 pages of typewritten matter and 81 maps were laid before the court. The following calendar of events indicates the deliberateness with which the lawyers and justices proceeded with their work. It took three years and a third to settle this case.

1932

Oct. 17 Motion for leave to file bill of complaint submitted by Wisconsin; motion granted Oct. 24; process ordered to issue returnable within 60 days.

Nov. 7 Bill of complaint filed with the Supreme Court.

1933

Jan. 23 Special Master appointed by a Supreme Court order (288 U. S. 588).

May 15 Public hearings commenced before Special Master at Madison, Wis., followed by hearings at Detroit Harbor on Washington Island, Wis., Sister Bay, Wis., Menominee, Mich., Sturgeon Bay, Wis., Lansing, Mich., and Chicago, Ill.

1934

Apr. 9 Two-day argument commenced before the Special Master at Chicago, Ill.

Nov. 12 Special Master's report filed with the Supreme Court.

1935

Feb. 11 Argument commenced before the Supreme Court and adjourned because record of testimony had not been printed.

Apr. 8 Argument resumed and concluded before the Supreme Court.

May 20 Opinion handed down by the Supreme Court and Special Master designated to draft boundary decree.

Aug. 22 Public hearings on form of decree commenced before Special Master at Menominee, Mich., and concluded at Milwaukee, Wis.

1936

Jan. 13 Special Master's supplemental report filed with the Supreme Court.

Mar. 2 Final argument commenced before the Supreme Court; completed Mar. 3.

Mar. 16 Decree handed down by the Supreme Court and case closed.

No attempt will be made in this paper to outline all the testimony and argument. Certain salient geographical situations will be outlined briefly, but the outcome in these areas will not be indicated until the results of the Special Master's recommendations have been summarized. First, however, we have a broad legal question.

THE ISSUE OF *RES ADJUDICATA*

One of the principal issues in this boundary suit was that called by lawyers *res adjudicata*. This Latin term seems to mean in law that any

matter already decided by a court of competent jurisdiction cannot again be made a ground of action between the same litigants. Michigan asserted in the answer to Wisconsin's bill of complaint that the Supreme Court might modify the 1926 decree by omitting the word "by" in the boundary course whose designation as "north by east" rather than "northeast" gave to Wisconsin the six and one-half islands in upper Green Bay and the small area in the Upper Peninsula of Michigan, and might modify it further by transferring from Wisconsin the tract in the Menominee River called Sugar Island; in addition the defendant stated her conviction that "other than as above set forth . . . the matters and things set forth and alleged in said bill of complaint are *res adjudicata* under the opinion and decree heretofore rendered by this court in this matter."

Wisconsin argued effectively against this position and the Special Master included among his findings that "mutual mistakes were made in the decree in the former case," that "the decree being a consent decree and being erroneous . . . , it may properly be corrected in this action," and that "inasmuch as the issue of dominion over the *water* area in Green Bay, as distinguished from the *islands* therein, was not directly in issue in the former suit, that no evidence was offered in the former case upon that question and no definite pronouncement made by the court, complainant is not barred from prosecuting this action to have the true location of the portion of said boundary involved in this case now determined."

In the author's paper on the Michigan-Wisconsin boundary case of 1923–26 several statements were made to which it is now pertinent to revert. Allusion was made to "the factor of accident" (these *Annals*, Vol. 20, 1930, p. 107), to the fact that the transfer of 707 square miles of water and 4,225 acres of land from Wisconsin to Michigan might be accomplished by "omitting the superfluous word *by* from one course in Green Bay" (*ibid.*, p. 157), and that "if this decree were to be modified some time, it might be well for Counsel for the two States to consider suggesting that the Court approve some half dozen groups of changes in phraseology"; one of these changes was stated as follows: "most important of all, the courses and distances between Chambers Island and Rock Island Passage might be rephrased so as to follow the western and northern of Captain Cram's ship channels of 1840 rather than the tracks of modern powered vessels; this would keep the State boundary a bit farther off the coasts of Washington Island and Rock Island and make it possible to use the lighted and easily-identified Whaleback Shoal and St. Martin Shoal as turning points in the water boundary" (*ibid.*, pp. 153–154).

Certainly the substitution of the phrase "north by east" for the word "northeast" in the Supreme Court's 1926 decree was an accident. Cer-

tainly it is desirable that a water boundary be kept far enough off shore so that fishermen may have access to the waters immediately adjacent to their home coves and anchorages. And yet, if the word "by" had been deleted and at the same time the claim of *res adjudicata* had been successfully maintained by Michigan the fishermen of Wisconsin would have been denied normal access to the waters near their own shores. Under such circumstances these fishermen might have wished they had been transferred to Michigan in the first boundary case rather than to have continued to be citizens of Wisconsin while their fishing waters were transferred to Michigan.

Let us see how this mistake arose. In the boundary case of 1923–26 Michigan was claiming Rock Island, Washington Island, Detroit Island, Plum Island, and other small bodies of land between the Rock Island Passage and the Port des Morts Passage from Lake Michigan to Green Bay, as well as Chambers Island, the Strawberry Islands, Hat Island, and other bodies of land within Green Bay. The Supreme Court said in its opinion of March 1, 1926, that Michigan had "failed to maintain her case in any particular; and that the claims of Wisconsin as to the location of the boundary . . . are sustained." No evidence concerning a precise position for the State boundary within the waters adjacent to these islands was presented to the Supreme Court in 1923–26.

Flushed with victory, diverted by the problem of Sugar Island which the Supreme Court had surprisingly awarded to Wisconsin in the 1926 opinion, the special counsel for that State accepted the proposal of the special counsel for Michigan that the boundary established by the Supreme Court's decree of 1926 should follow a modern steamship course printed upon the 1924 lake survey chart which these lawyers had before them. This course ran very close to Rock Island, Washington Island, and Chambers Island.

The description of the steamship course had to be expressed in words for the boundary decree. It happened that the course was phrased in terms appropriate for vessels running from east to west and that the boundary was to be described from west to east. In transposing the chart words "SW ⅞ W 27 miles" into boundary words the Michigan attorney intended to render them "northeast seven-eighths east 27 miles" but he actually rendered them "north by east seven eighths east 27 miles." This was the happy accident. But for that error, and others to which reference will be made, the case presumably would not have been reopened. When it was reconsidered the issue of *res adjudicata* probably had to be raised, or lawyers would not be lawyers; but, if the Special Master and eventually the Supreme Court had not decided that this issue was no issue, the equable boundary of the final decree of 1936 could not have been established. Wis-

consin fishermen therefore owe a great deal to the working of the factor of accident ten years ago.

THE SUBJECTS IN DISPUTE

Whaleback Shoal and the Geographical Centre of Green Bay

Half-way from Washington Island to the mainland of Michigan in Green Bay is Whaleback Shoal, a group of reefs with a light, a bell, and several buoys or spars upon it. In order to make the situation concerning the relation of the boundary to the geographical centre of Green Bay a specific one rather than a general one, a salient portion of the evidence covering Whaleback Shoal may be summarized.

A great many fishermen, sailors, pilots, and masters of vessels testified before the Special Master concerning the boundary in Green Bay. Most of the fishermen said they had never heard of a State boundary close to Washington Island and Rock Island, a few said they thought it was near Whaleback Shoal, and several of them said it was precisely there. One fisherman attested that about 1910 "Whaleback Shoal buoy used to be marked 'Wisconsin' "; another testified that about 1908 "it said 'Wisconsin' on the buoy"; a third was sure that "there used to be a Wisconsin seal on the buoy when I first fished there" (*Transcript of testimony before the Special Master,* pp. 48, 55, 115). The buoy referred to was two miles northwest of the boundary claimed by Michigan in 1932 and therefore within the area she aspired to possess.

Wisconsin introduced as exhibits eight official Michigan maps, published every alternate year when the legislature was in session between 1917 and 1931. All of them represented the State boundary as being near the geographical centre of Green Bay rather than close to the coasts of Rock Island, Washington Island, and Chambers Island, Wis.

A series of official federal maps of Michigan and Wisconsin likewise depicted the State boundary by a conventional line running through the geographical centre of Green Bay. The U. S. Geological Survey, the General Land Office, the Post Office Department, and the Bureau of Census had published such maps, but not all of them were introduced in evidence. Curiously the lawyers for both sides seem to have overlooked the fact that two editions of a Lake Survey chart which was in evidence as an exhibit in 1932–36 differed in one significant respect. The Michigan exhibit demonstrated that the direction of the sailing course from Chambers Island to the Rock Island Passage was "SW by W" in 1864–66 while the Wisconsin exhibit showed that the course had been changed to "SW ⅞ W" a few years later. Although these two charts [Michigan Exhibit B and Wisconsin Exhibit 22] did not indicate the State boundary they proved that ships'

courses in Green Bay are frequently shifted and therefore made clear how unwise it was to consider using a sailing course for a State boundary.

Then there was "the Attorney General's map," a map which was hanging in the office of the Attorney General of Michigan at the time when the Supreme Court's Special Master was taking testimony at Lansing, Mich. The incident is not without importance. A geographer was on the witness stand during the first of the four long days of expert testimony which he gave in August and September, 1933 (*Transcript of testimony, cit.*, pp. 721–25, 756–919, 923–1049). One's colleagues must not jump to the conclusion that this geographer was superlatively garrulous because his tongue ran on for 294 pages of direct testimony and cross examination; remember that a third or half of that was lawyers' questions and judicious inquiries by the Special Master.

Counsel for Wisconsin asked this geographer whether he had ever seen a map which depicted the State boundary as a line in the geographical centre at Green Bay and showed Whaleback Shoal as a part of Wisconsin. He said he had seen such a map and that it was hanging at that moment in in the office of the Attorney General of Michigan in that very building. The Special Master adjourned the hearing so that the map might be borrowed and laid before him. The Attorney General of Michigan courteously presented the map to the Special Master and it was introduced as an exhibit by Wisconsin as Plaintiff's Exhibit No. 45. It was the Kenyon highway map of Michigan (Fig. 4), scale 1 inch to 8 miles, published in 1917 at Des Moines, Iowa, by a reliable map publisher known to the Special Master in his own home city.

That the Attorney General's map was no mere sport was shown by the finding at Lansing of two other maps which also showed "Whales Back Shoal" as a part of Wisconsin. By engraved lines these maps depicted the State boundary near the geographical centre of Green Bay. In the office of the State Treasurer at Lansing, Mich., these other maps were in actual use by Michigan officials. They were two identical copies of the Scarborough wall map of Michigan, published at Indianapolis, Indiana, in 1911, and used at Lansing in 1933 and perhaps for the 22 years from 1911 to 1933, in connection with the assessment of taxes by the State of Michigan. Certainly the administration of tax assessment requires accurate knowledge of the limits of taxable territory. Obviously the chief legal officer of a State should know the boundaries of his jurisdiction. The maps upon which these high officials of Michigan seemingly depended in 1933 for important geographical business showed the boundary in Green Bay essentially as Wisconsin held that it was and not as Michigan asserted.

One body of information highly persuasive with respect to the boundary near Whaleback Shoal was contained in publications of the federal govern-

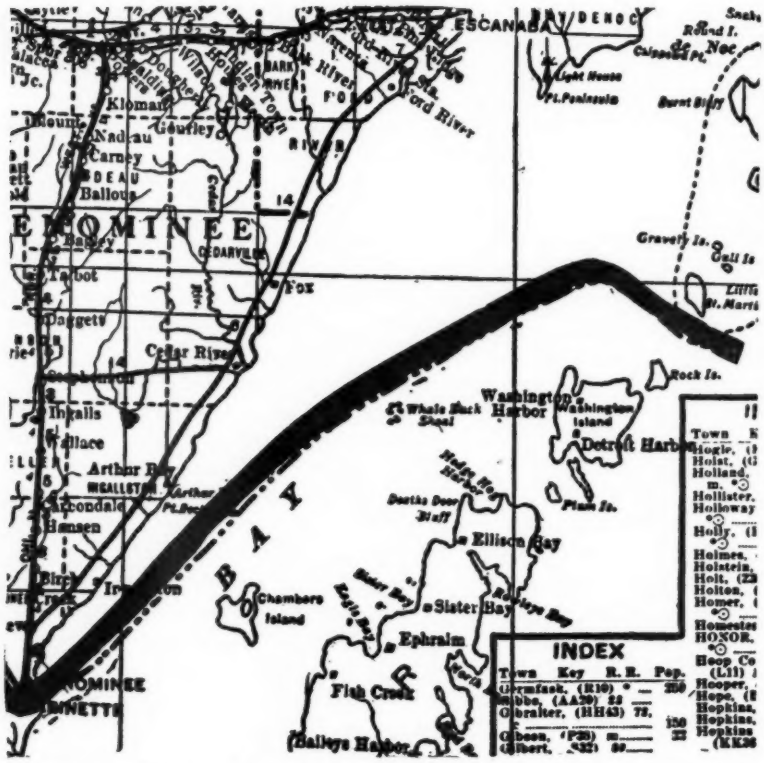


Fig. 4.—"The Attorney General's Map." Part of *Kenyon's Highway Map of Michigan*. Copyright 1917 by The Kenyon Company, Des Moines, Iowa. From Wisconsin Exhibit No. 45, Wisconsin-Michigan boundary case of 1932–36. The wide black line west of "Whale Back Shoal" is the State boundary; it reinforces the engraved dot-and-dash line which it parallels.

ment. Curiously it was not directly submitted in evidence in 1932–36 by the parties to this suit. In the Michigan-Wisconsin boundary suit of 1923–26 the State of Michigan had introduced as Exhibit No. 109 an extract from an official federal government publication entitled *Light and Fog Signals of the United States*. Upon page 128 of this exhibit appears a reference to "Whaleback Shoal East End Gas Buoy, No. 4, Moored in 18 feet of water, on the SE'ly end of Whaleback Shoal, Wis." The words "Whaleback Shoal, Wis." also appear in the index of this volume, as well as in at least five other publications between 1907 and 1933. These are the editions of the same federal light list dated 1907 (at pp. 124 and 211), 1910 (at pp.

167 and 180), 1915 (at pp. 256 and 272), 1921 (at pp. 204 and 219), 1927 (at pp. 242 and 259), and 1933 (at pp. 224 and 278). The 1934 light list included at pages 230 and 286 the words "Whaleback Shoal East End Lighted Bell Buoy 4, Fl. W. 6 sec. In 18 feet, on Southeast point of shoal. Wis.," and the words "Whaleback Shoal Lighted Bell Buoy, Wis." Thus the words "Whaleback Shoal, Wis." appear a dozen times as recorded above and doubtless still more, in federal publications which were not laid before the Special Master in 1932–36. Moreover in the boundary suit of 1923–26 Michigan had herself introduced Exhibit No. 128 upon page 32 of which is the statement that Whaleback Shoal lies "in the waters of Door County," that county of course being a part of Wisconsin. Still further the U. S. Treasury Department published in 1897 in *Bull. 77, U. S. Lighthouse Board,* at page 7, under the large printed heading "Wisconsin," a description of the Whaleback Shoal East End Gas Buoy. So for 37 years, from 1897 to 1934, the federal government published from time to time and perhaps annually a statement that Whaleback Shoal was in Wisconsin; but neither Michigan's fishermen nor her conservation commission's patrol boats who use these light lists ever objected to these notoriously public announcements that the State boundary was in the middle of Green Bay rather than close to the shores of Washington Island and Rock Island.

Lights Illuminate the Boundary in Rock Island Passage

Three centuries ago when Jean Nicolet sailed into Green Bay there were no coastal lights except the campfires of the Indians; one century ago the Pottawatamie Lighthouse was built upon Rock Island; today there are lights for mariners upon St. Martin Island, Mich., north of the Rock Island Passage, upon Rock Island, Wis., south of this passage, and half way between upon St. Martin Shoals (Fig. 4). What an ideal place for a lighted State boundary! In 1932, however, by deleting the word "by" and opposing other modifications, the State of Michigan tried to have the boundary fixed within a quarter of a mile from Rock Island rather than in the middle of the passage between St. Martin Island on the north and Rock Island on the south. The strait is about four and a half miles wide. Wisconsin maintained that the boundary ought to be upon St. Martin Shoals, half way from one island to the other, and that the lighted buoys upon that shoal were ideal turning points in the boundary. Federal Lake Survey charts give no boundary lines. U. S. Geological Survey maps show the boundary in mid-channel. So do the official maps in every edition of Michigan's directory and legislative manual from 1917 to 1937 (Fig. 5), as well as "the Attorney General's map."

Strangely the federal government's light lists were not submitted in evi-

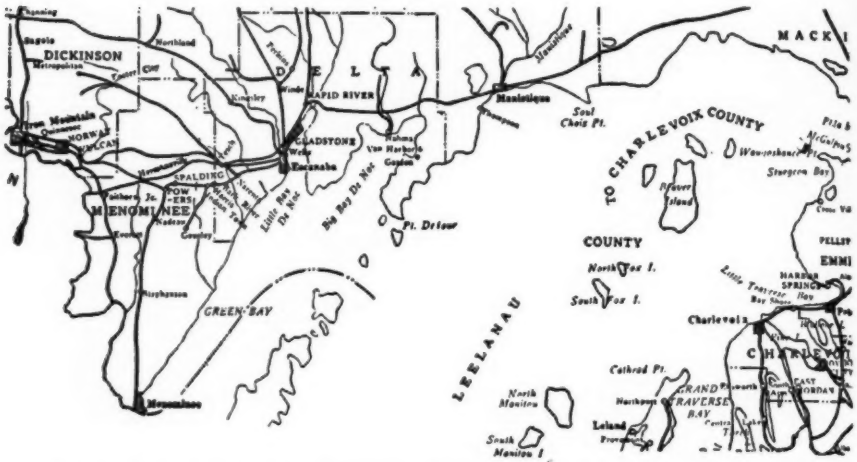


Fig. 5.—Part of map of Congressional Districts, Upper Peninsula of Michigan, which appeared in the *Michigan Official Directory and Legislative Manual* published under the direction of the Secretary of State of Michigan every alternate year from 1917 to 1931. Copyright 1925 by C. W. Chadwick, Ann Arbor, Mich. The curved line running between the words "Green" and "Bay" is the State boundary.

dence. Between 1915 and 1934, and doubtless annually, the U. S. Department of Commerce indicated that the State boundary was either in the middle or north of the middle of Rock Island Passage, by making in light lists such assertions as the following:

> "Lake Michigan, Rock Island Passage Gas Buoy, 2, Occ. R., 20 sec. In 34 feet, on southeast point of detached shoal. (Wis.)" (see 1915 light list at page 252).
>
> "Rock Island Passage Gas Buoy, Lake Michigan, Wis." (see *ibid.*, index).

The same statements in varying language also appeared in 1921, 1927, 1933, 1934, and doubtless in the intervening years. Thus, although the federal authorities attributed this shoal in mid-channel to Wisconsin, Michigan officials never protested. At least eleven of the fishermen who testified as witnesses asserted that the State boundary in Rock Island Passage ran substantially across the lighted buoy referred to above. They had been in these waters from 15 to 49 years and knew whereof they spoke.

The Gap in the Boundary in Upper Lake Michigan

In Lake Michigan east of the Rock Island Passage there came very near being a 36-mile gap in the boundary. This arose in the following manner.

In 1931 when the Attorney General of Wisconsin asked for geographical advice as to how the revised boundary might best be drawn (*supra,* table on p. 84) it was suggested that the final course in the line should run from the shoals in Rock Island Passage to "the middle of Lake Michigan southeasterly of St. Martin Shoal." But the Assistant Attorney General who drafted the boundary proposal in Wisconsin's bill of complaint departed from the geographer's suggestion in this one instance. Instead of a boundary running southeastward to the middle of Lake Michigan he proposed one extending in a slightly northeasterly direction, *i.e.,* "east three-quarters north," and his proposal was adopted and approved by the Special Master.

Now the eastern terminus of the State boundary in the suit in 1932–36 had to connect with the north-south boundary in Lake Michigan for which Congress had made provision a century before. The Act of April 20, 1836, provides for a boundary running northerly and southerly through the middle of Lake Michigan "to a point in the middle of the said lake, and opposite the main channel of Green Bay" (Fig. 6). This point is actually about 36 miles southwest of the mid-lake terminus of a line extending east three-quarters north from the mouth of Green Bay.

This situation arose because the Special Master innocently accepted

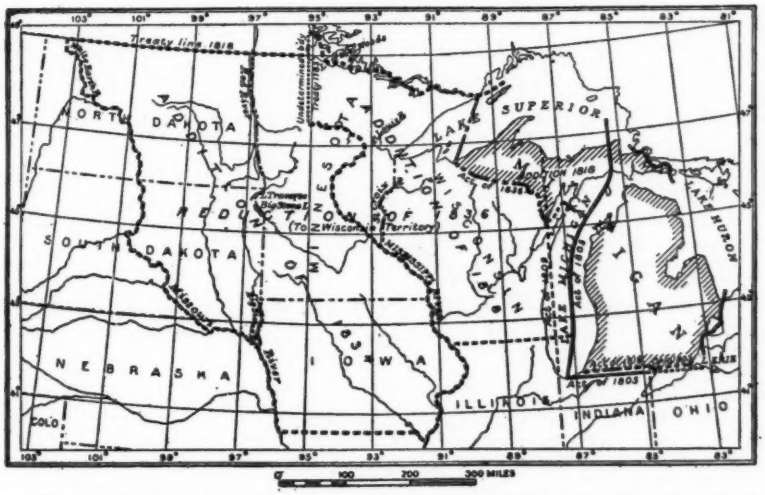


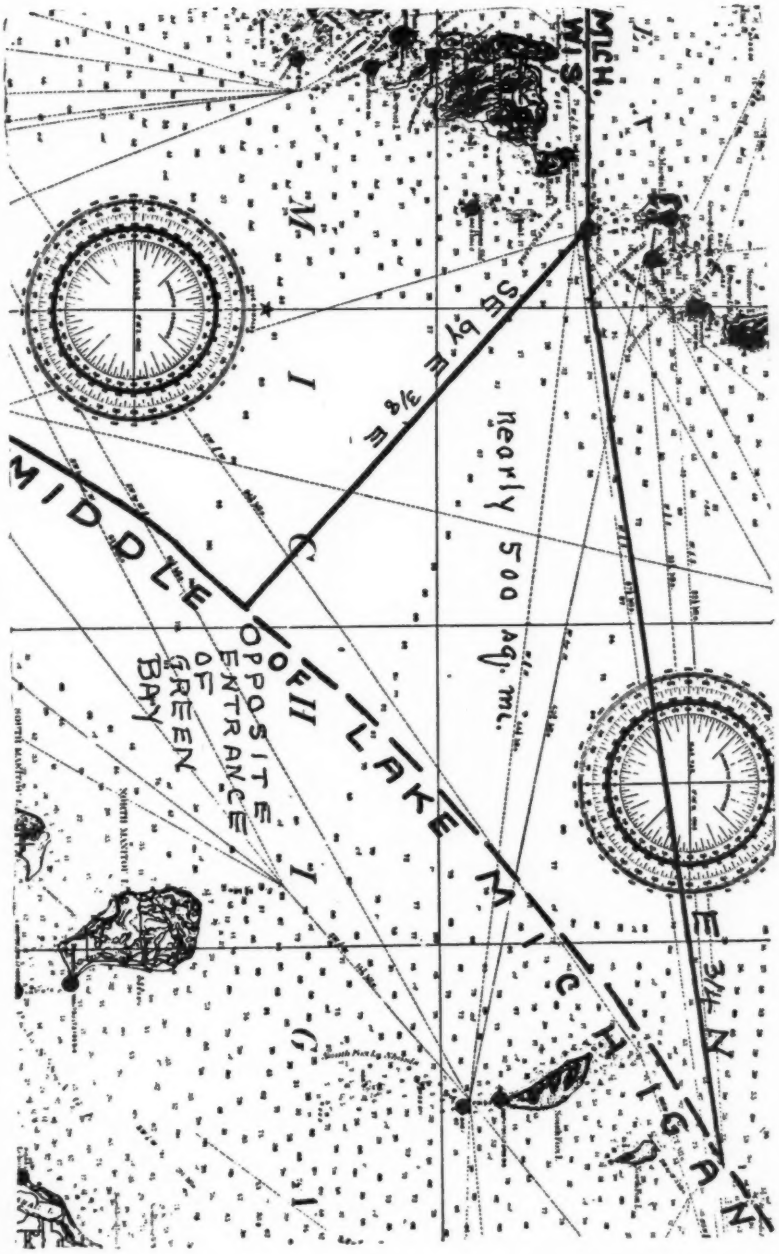
Fig. 6.—Map showing why it was necessary for the Green Bay boundary fixed in the Wisconsin-Michigan boundary case of 1932–36 to extend southeastward in in order to meet the northern terminus of the boundary which Congress fixed in the middle of Lake Michigan in 1836 upon the basis of a line laid out in 1805. From *Bull. 689, U. S. Geol. Survey,* p. 173.

Wisconsin's final proposed boundary course (*Bill of Complaint,* p. 33) "thence east three-quarters north to the boundary between the State of Michigan and the State of Wisconsin in the middle of Lake Michigan." Such a boundary course would *never* touch a point in the middle of Lake Michigan opposite the main channel of Green Bay. Wisconsin's Assistant Attorney General innocently introduced those words in the Wisconsin bill of complaint in 1932, taking them from the Supreme Court's 1926 decree, except that he substituted "three-quarters" for "three-fourths." The Supreme Court in turn innocently introduced these words in the 1926 decree, taking them from Michigan's motion to amend the form of decree submitted by special counsel for Wisconsin, except that the court substituted the words "in the middle of Lake Michigan" for the words "in Lake Michigan."

Thus Michigan made a boundary proposal in 1926 that was copied by the Supreme Court in the same year, then by the Attorney General of Wisconsin in 1932, and then by the Supreme Court's Special Master in 1935. It would have made a gap of 36 miles in the boundary. It would have deprived Michigan of 500 square miles of valuable fishing grounds in upper Lake Michigan (Fig. 7).

Moreover, except for the happy accident in 1926 when "north by east" was written for "northeast" in a boundary course 50 miles southwest of this locality, and except for the Supreme Court's wise conclusion in 1936 that this case was no *res adjudicata,* there would have been a 36-mile gap in the boundary, and Michigan and Wisconsin and the Supreme Court might have had the labor and embarrassment and expense of a third boundary suit in some future year. It seems unlikely that the Special Master had given much consideration to the easternmost course of the boundary which he described a couple of times in his alternative proposals as running in a general westerly direction or as running eastward. If the Supreme Court had issued a new decree in 1936 using either the E. ¾ N. course or the words *eastward* or *westward* there would have been a long gap in the boundary. Only one point in the center of Lake Michigan is opposite the middle of the Rock Island Passage and that point is southeast from the passage and not east or north of east from it. Fortunately, as will appear later, the Special Master subsequently observed this situation and drafted a decree whose easternmost boundary course ran southeastward from the Rock Island Passage.

Fig. 7.—Map showing why there would have been a gap of about 36 miles in the Michigan-Wisconsin boundary if the Special Master had not changed the easternmost course from *East three-quarters north* to *Southeast by east three-eighths east;* but even this direction was not quite right. Scale: 1 inch = 8½ miles.


MICH.
WIS.
SE by E ¾ E
nearly 500 sq. mi.
MIDDLE OF LAKE MICHIGAN
E. ¾ N.
OPPOSITE ENTRANCE OF GREEN BAY

The Ship Channel West of Chambers Island

Within the straits between Chambers Island and the Michigan mainland Wisconsin aspired to have a midchannel boundary while Michigan desired that the new State line in 1936 should be as contemplated in 1926, that is along the course of modern, powered vessels close to the island. Michigan was able to produce no serious evidence that the boundary she desired in the straits west of Chambers Island ought to hug the coast of the island and therefore deprive Wisconsin fishermen of their fair half of these fishing grounds. Wisconsin submitted two cogent pieces of evidence.

Captain Thomas Jefferson Cram who marked parts of the Michigan-Wisconsin boundary in the territory between Green Bay and Lake Superior in 1840–41, at the behest of Congress, had produced an extremely pertinent map. It showed his construction of two alternatives for the water boundaries set up by Congress in 1836 and was published in 1841 (Fig. 8). The map indicated that, if there were going to be a State boundary in the straits west of Chambers Island, Captain Cram thought it should be nearly in the middle of this ship channel rather than close to the Chambers Island shore.

Wisconsin also demonstrated what happened in three actions in replevin between 1908 and 1910 in the circuit court of Marinette County, Wis., between Wisconsin fishermen and Michigan conservation officers. The fishermen recovered very small damages as well as long gangs of nets which the Michigan officials had seized in the belief that they were in Michigan. All three gangs of nets extended across the State boundary claimed by Michigan. The court held that the nets were in Wisconsin and, although a geographer, ignorant of the finer points of legal decisions, might have considered that this law suit denied Michigan's and upheld Wisconsin's boundary claim, the wise and accomplished Special Master found the record in this case to be incomplete and not at all determinative of the question involved.

The Triangle of Fishing Waters Opposite the Mouth of the Menominee

Allusion has been made several times to the triangular fishing grounds in Green Bay opposite the cities of Marinette, Wis., and Menominee, Mich. Here the Michigan authorities fired the opening shot in the boundary battle of 1932–36. They ejected some 200 Wisconsin fishermen and the lawyers took up the matter. Actually the 33 square miles of water in this triangle lie mostly opposite Menominee. Marinette lies immediately to the south. The Supreme Court really did intend to award this area to Michigan in the boundary suit of 1923–26. Errors were made in the boundary description,

FIG. 8.—Capt. T. J. Cram's map of ship channels in Green Bay, from *Sen. Doc. 151, 26th. Congress, 2nd. Sess.*, published Feb. 3, 1841. The islands called *Mahnomah, Kayshah* and *Pootowotomee* on this map are Chambers Island, Washington Island, and Rock Island, respectively.

MAP OF

GREEN BAY

Exhibiting the various Ship Channels Compiled from various Maps. To accompany the Report of Capt. T.J. Cram T.E. on the proposed Boundary between Michigan and Wiskonsan. December,

1840

Scale 12 Miles to 1 inch

W.J. Stone Sc. Wash

however. The lawyers who agreed on the decree of 1926 formulated a boundary description which included the distance $7\frac{1}{2}$ miles when $7\frac{1}{8}$ miles was meant, as well as to a compass direction which read "east by south" when "east by south one-eighth south" was intended. The first of these two distances and directions the Supreme Court accepted and used in the 1926 decree.

The difference between the boundary direction specified and that intended is only 1° and, at first blush, the error of three-eighths of a mile in distance might not seem to matter. But, as was shown by the testimony of a geographer in 1933, these errors initiated a *reductio ad absurdum*. The Supreme Court's 1926 decree provided that this boundary should go from the mouth of the Menominee River "in a direct line to the most usual ship channel of Green Bay" and, a bit farther on, the decree said that this line was to run "$7\frac{1}{2}$ miles to the centre of the most usual ship channel of the Green Bay; thence along the said ship channel . . .," etc. Of course a direct line is the shortest possible line between the initial point and the objective, and even an error of 1° renders the line longer than a direct line. Moreover, the objective called "most usual ship channel" in 1926 was a modern steamship course on a recent chart. As the distance specified overran that steamship course, it is obvious that the boundary could not continue "thence along said ship channel." Moreover the continuation of this line in the terms specified by the boundary decree of 1926 was impossible as the centre of a supposed ship channel. A few miles to the north it ran across a big shoal at the southwest cape of Chambers Island, going through the dangerous waters between the light on the shoal and the land. Unless it be in Alice's travels in Wonderland, ship channels do not traverse the landward sides of lights on shoals when there is deep water a short distance away. Finally the continuation of this erroneous line, following a sixth or seventh cumulative error, actually ran ashore and cut off the north end of Rock Island, Wis., leaving the lighthouse in Michigan (Fig. 9). As to that, even if ships, other than airships and prairie schooners at least, could sail blandly over the landward side of a lighthouse while "continuing," as the Supreme Court's 1926 decree provided, "along said ship channel," they would hardly be "passing through the Rock Island Passage into Lake Michigan" as the Supreme Court had also provided. And if lawyers' geographical absurdities had not otherwise reached a climax, how could the State boundary go along the landward side of the Rock Island lighthouse, leaving the light and the north tip of Rock Island to Michigan when that State had claimed the whole of Rock Island in 1923–26 and the Supreme Court had said in its 1926 opinion, which preceded the decree, that complainant, *i.e.*, Michigan, "has failed to maintain her case in any particular," and therefore had failed to acquire any part of Rock Island?

The happy mistakes with respect to the 1° error in direction and the three-eighths mile error in distance at the mouth of the Menominee, combined with the fair conclusion that this was not *res adjudicata,* made it necessary for the court to reconsider the status of the 33 square miles of water at the mouth of the Menominee.

Michigan asked merely for the correction of these two errors; Wisconsin urged that the boundary line be drawn northeastward from the mouth of the river to the middle of the channel between Chambers Island and the Michigan mainland. Michigan's official maps supported Wisconsin, as did the *Sketch of Public Surveys in Michigan,* published by the Surveyor General's office at Detroit, Mich., on Nov. 1, 1855 [Wisconsin Exhibit No. 12].

Both Wisconsin and Michigan introduced one Lake Survey chart of the south end of Green Bay, originally published in 1864, less than 30 years after Congress established the Michigan-Wisconsin boundary. But Wisconsin Exhibit 22 was one edition of this chart and Michigan Exhibit B was a different edition. The first showed a sailing course extending northeastward from the waterfront at Menominee, not the river mouth, to a point $2\frac{1}{8}$ miles west of Chambers Island; the second showed this sailing course terminating $1\frac{3}{4}$ miles from the island; still another edition of this chart placed the terminus of the sailing course $1\frac{3}{8}$ miles from the island. Could

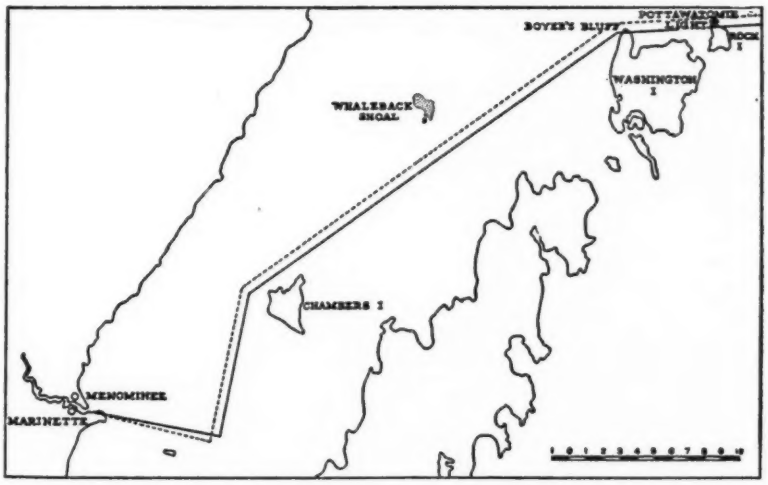


FIG. 9.—Map showing how an error of 1° in direction and three-eighths of a mile in distance opposite Menominee and Marinette resulted in the *reductio ad absurdum* of a Michigan claim that she should have the north tip of Rock Island, Wis., and the Pottawatomie lighthouse.

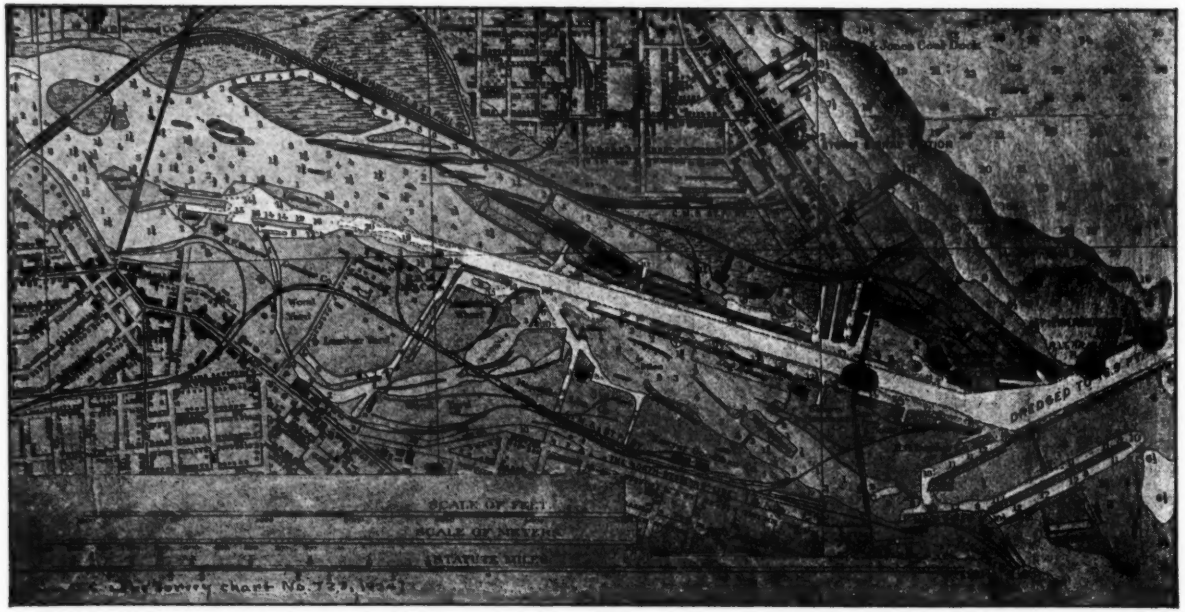


FIG. 10.—Sugar Island and Grassy Island near the mouth of the Menominee River from *Chart No. 723, U. S. Lake Survey*, edition of 1924. The whole of the island crossed by the bridge farthest upstream (near the left margin of the map) was awarded to Wisconsin by Congress in 1846. Since 1924 Grassy Island, Sugar Island, and the three intervening islets have been tied to each other and to the Michigan mainland by artificial filling (compare with Fig. 1).

anything demonstrate more fully the folly of attempting to use shifting sailing courses of vessels as a basis of State boundaries? But if sailing courses, or courses of powered vessels be legitimate proof of the position of "the centre of the most usual ship channel" in Green Bay in 1836, the 1864 chart is the earliest identified item of precise evidence. It supports Wisconsin's claim to the triangle of water opposite the mouth of the Menominee.

The Special Master found that "both Wisconsin and Michigan fishermen plied their occupations in the triangular disputed area."

Sugar Island and Grassy Island in the Menominee

Both Sugar Island and Grassy Island, with the intervening islets, as will be recalled, fell to Wisconsin in the Supreme Court's 1926 opinion, through the provision which gave Wisconsin all the islands in the Menominee below Quinnesec Falls. An opinion in a boundary case is often merely a general territorial award; a decree is likely to contain a specific boundary description. Sugar Island being urban and highly taxable (Fig. 10) was desired by Michigan. Wisconsin was perfectly willing that Michigan should keep it and the intent of the court's 1926 decree was to award this one island to Michigan. For technical and legalistic reasons this attribution could not become effective, and here again the error was a happy one, for the 1926 decree had given only the east half of Grassy Island to Michigan and had left the three unnamed intervening islets in ambiguity. By 1932, however, all five islands had been united by artificial filling and, through the work of man not of the river, had also been attached to the Michigan mainland (Fig. 1), thus complicating the problem of the Supreme Court.

The Sugar Island problem played no significant part in the boundary case of 1932–36 and would not be mentioned in this paper if it were not for a slight infelicity in the 1934 report of the Special Master. He gave as a reason for assigning these river islands to Michigan one which is not defensible, namely that they are not islands. But they are islands. In 1848 Congress admitted Wisconsin to the Union as a State with boundaries as provided in the enabling act of 1846 and in the year 1848 a federal Surveyor General mapped the lower Menominee River in detail (Fig. 11) and showed Grassy Island as an island and Sugar Island as two (these *Annals*, Vol. 20, 1930, page 126 and map on page 147). The situation must be mentioned here because of the unfortunate fact that the Special Master's conclusion that Grassy Island "was subaqueous land, and not an island proper" has been cited recently by Virginia attorneys in a controversy respecting the Virginia-District of Columbia boundary and the islands in the Potomac River at Washington, and might be so cited in other legal cases in years to come.

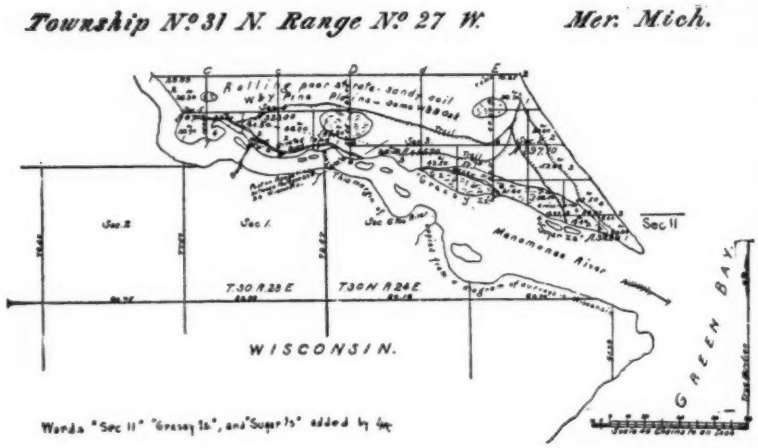


FIG. 11.—Map of the mouth of the Menominee River in 1848 from official plat of the General Land Office. In 1926 the Supreme Court awarded the two islets marked "Sugar Island" and the west half of "Grassy Island" to Wisconsin. In 1936 these islands were given to Michigan which had always had, taxed, and administered them.

THE BOUNDARY AWARD

The Special Master's two reports to the Supreme Court, the Wisconsin briefs and arguments, the briefs and arguments of Michigan, the court's opinion, and its decree may now be summarized.

The Special Master's 1934 Report

Following sympathetic hearing of the evidence and the arguments of the parties to this suit Judge Faville reported his findings of fact and law and his recommendations to the Supreme Court essentially as follows. He thought Michigan's claim of *res adjudicata* should be denied. Grassy Island and Sugar Island in the Menominee River were awarded to Michigan. To Wisconsin was given the triangle of fishing waters in Green Bay opposite the cities of Marinette, Wis., and Menominee, Mich. Michigan was allotted much more than half of the waters of the Green Bay channel west of Chambers Island. To Michigan was awarded conditionally within Green Bay a boundary essentially such as would emerge if the erroneous 1926 boundary were to have been corrected by the omission of the word "by" from the famous clause "north by east seven-eighths east" and this, as geographers will observe, would have given Michigan a water boundary extremely close to the coasts of Washington Island and Rock Island. Al-

ternatively, under conditions set forth below, Wisconsin was given a boundary in the middle of Green Bay running northward from Chambers Island to a point due west of the middle of the Rock Island Passage. The condition, however, was that the Supreme Court should choose this boundary rather than the first alternative presented and recommended by the Special Master. Let us pass this problem for the moment and return to it below. To Wisconsin was given a moiety of the Rock Island Passage presumably with a turning point on the lighted shoal half way from Rock Island to St. Martin Island, as well as some 500 square miles of the waters of upper Lake Michigan and a clouded boundary whose terminus was separated by some 36 miles from the northern end of the boundary in the middle of Lake Michigan as fixed by Congress 98 years before in 1836.

The reason for the Special Master's having unexpectedly made a part of his boundary recommendation in the alternative was that he thought both parties to the boundary suit were wrong in one respect. First let us read his recommendations with respect to the portion of the boundary from Chambers Island to the Rock Island Passage (see Fig. 3).

"I am conscious of the fact that, in view of my findings of fact, my recommendations for a decree as to the Green Bay section must be in the alternative. I can not avoid this. This I regret.

"I therefore submit the following recommendations: (1) If the court accepts the Master's conclusion to the general effect that the channel referred to in the Acts of Congress is one between the islands that separate Green Bay and Lake Michigan, then the boundary line should be drawn from a point in the middle of Lake Michigan opposite the center of the Rock Island passage, thence in a general westerly direction through the center of said passage, and thence in a course capable of navigation by the most direct route to the mouth of the Menominee river. It would follow the red line on the map (R S Q) to the objective off Boyer's Bluff (marked by the letter Q), and thence in a direct line to a point approximately two miles west of the Chambers island light (the red line from Q to O on the map), and thence in a direct line approximately eleven miles to the center of the mouth of the Menominee river. The exact technical description of the line I have indicated is easily ascertainable, and can be correctly embodied in a decree. Such decree I recommend.

"(2) If, however, I am in error in my construction of the Congressional Acts as applied to the situation, and the court holds, as counsel for both parties assume, that the terms 'most usual ship channel' or 'main channel' refer to a channel in the body of Green Bay proper, west of Chambers Island, then I recommend that the line be drawn in substantially the following manner: proceeding from the center of the mouth of the Menominee river—that is, the center between the pierheads as now located—thence north and eastward in the geographical center of the portion of Green Bay lying west of Chambers Island to a point where said line would intersect a line extended westward through the center of the Rock Island passage to the Michigan mainland, and thence eastward through the center of the Rock Island passage to the center of Lake Michigan. The description I have outlined could be readily ascertained technically and incorporated in a decree" (*Report of the Special Master*, pp. 44–45).

Judge Faville had previously stated, in his findings of fact and conclusions of law (*loc. cit.*, pp. 30–45), that both Wisconsin and Michigan had assumed something unjustified in the boundary suits of 1923–26 and of 1932–36 concerning the boundary descriptions in the Act of Congress, approved April 20, 1836, creating the Territory of Wisconsin as well as in the Act approved June 15 of the same year under which the Territory of Michigan became a State. These laws include the provisions printed below in parallel columns. The descriptions run in reverse order.

Wisconsin Enabling Act

". . . Bounded on the east, by a line drawn from the northeast corner of the State of Illinois, through the middle of Lake Michigan, to a point in the middle of said lake, and opposite the main channel of Green Bay, and through said channel and Green Bay to the mouth of the Menomonie river . . ." (from *Public Statutes at Large*, Chapter LIV, approved April 20, 1836).

Michigan Enabling Act

". . . to the main channel of the said Menomonie river; thence, down the centre of the main channel of the same, to the centre of the most usual ship channel of the Green Bay of Lake Michigan; thence through the centre of the most usual ship channel of the said bay to the middle of Lake Michigan; thence through the middle of Lake Michigan to the northern boundary of the State of Indiana . . ." (*op. cit.*, Chapter XCIX, approved June 15, 1836).

Both Michigan and Wisconsin assumed that the descriptions refer to a channel in the main body of Green Bay. The Special Master said: "I find as a fact that practically this entire body of water is one wide channel" (*Report cit.*, p. 33); he stated further: "if, as a fact, there did exist in 1836 any such thing as 'the most usual ship channel' in the body of Green Bay, its true location can not now be ascertained and the same can not now be definitely established" (*ibid.*, p. 34); he also went on to say:

"My own conclusion differs entirely from the contention of either of the parties. Both parties assume that the Enabling Acts, in making reference to 'the most usual ship channel of Green Bay,' or 'the main channel of Green Bay,' intended a channel extending north and south lengthwise of Green Bay, and the foregoing findings of fact and conclusions of law are based on such assumption. I deem this assumption to be erroneous, as I shall undertake to demonstrate in the next division of this report" (pp. 37–38).

Then Judge Faville gives the "Master's Construction of Congressional Acts" including the following conclusions. (1) Although Michigan and Wisconsin agreed in the 1923–26 suit and in that of 1932–36 that the word "channel" in the 1826 legislation referred to "a channel extending lengthwise of Green Bay north and south" the Special Master was unable to "accept the premise as correct" (pp. 38–39). He felt that in 1836 the words "main channel" could not have been applied to anything "other than the

main one of the channels that existed between Lake Michigan and Green Bay" (p. 40). Several other conclusions of the Special Master are alluded to below.

Here was the second major issue in the boundary suit of 1932–36. The first was that of *res adjudicata*—a lawyer's problem. The second was that set up by the Special Master—did Congress consider that there is a north-south ship channel within Green Bay? Half of that was more or less a geographer's problem.

The Supreme Court's 1935 Opinion

Following the submission of the Special Master's first report both Wisconsin and Michigan studied and prayed over his findings and his recommendations and wrote extensive briefs. Wisconsin's geographical adviser, being asked, set forth his views and these included a voluminous body of evidence which, as must be stated in fairness to the Special Master, had either not been laid before Judge Faville between 1932 and 1934 or had not been stressed adequately. This geographer pointed out that Wisconsin's Special Counsel might well consider presenting such arguments as the following with respect to the alternatives presented by the Special Master. For one thing it appeared to him that Wisconsin might reasonably take issue in its brief with the Special Master's conclusion

> "that Congress, in using the expressions 'main channel' and 'most usual ship channel,' meant to refer to the main one of the channels between the islands that separate Green Bay and Lake Michigan, and not to a channel in the open body of Green Bay" (*Report of the Special Master*, p. 44).

Seven main points seemed to be adverse to this conclusion. (1) The Special Master said to the Supreme Court in 1934:

"I think it significant that the Wisconsin Territorial Act was first passed. . . . Some months later Congress passed the Michigan Act" (*loc. cit.*, pp. 40, 41).

This point appears to fade in significance in view of the fact that the United States Senate passed the Michigan Act on April 2 (*Transcript of testimony in Michigan-Wisconsin boundary case of 1923–26*, p. 345), some 18 days before the approval of the Wisconsin Act of April 20 which passed the Senate Mar. 29 and the House Apr. 8. The only reason the Michigan Act was not approved by the President prior to June 15 was that the House of Representatives did not get around to the Michigan bill till June 14.

(2) It seems to a geographer that the second of two Acts of Congress would in any event be the governing one, and the Act of June 15 specifically refers to a boundary line running from the center of the main channel of

the Menominee River directly to "the center of the most usual ship channel of the Green Bay of Lake Michigan."

(3) Few geographers would consider that it is "an absurdity" or "an impossibility" (Special Master's report, page 40) to locate a point opposite the southeast end of a *curving* ship channel which runs first northeasterly, then easterly, then southeasterly.

(4) Captain T. J. Cram, who construed these laws for Congress itself and was so respected by Congress that he was specifically named in the Wisconsin Enabling Act of 1846, refers in his report of 1840 to the necessity of making "a complete hydrographic survey of all the channels that exist in that portion of Green bay east of the mouth of the Menominee river" (*Senate Doc. 151, 26th Congress, 2nd Session,* p. 8).

(5) Cram's "Map of Green Bay," 1840, scale 1 inch to 12 miles (*loc. cit.,* map No. 4, following p. 16) indicates the positions of two northeast-southwest channels in the part of Green Bay near the Menominee River, as well as two channels extending from Green Bay into Lake Michigan.

(6) Most important of all, Congress's own construction of the 1836 acts is extant. This is fortunate, for the Special Master's report includes the following statement: "Our polestar in these proceedings is the intent of Congress as expressed in the acts of 1836."

Three Bills introduced in three successive sessions of Congress appear to conform precisely to the Special Master's definition. These are respectively (a) S 9 in the 27th Congress, 3rd Session, (b) S 6 in the 28th Congress, 1st Session, and (c) H. R. 470 in the 28th Congress, 2nd Session.

These Bills tend to show the intent of Congress for the following reasons: (a) Each Bill was introduced by a Senator or a Representative from Michigan, obviously the most informed persons in Congress, where Wisconsin was not then represented; (b) each of the first two Bills was approved without amendment by the Committees on the Judiciary or on Territories, both of the Senate and of the House of Representatives, the ideal committees for the Special Master to look back to in 1934; (c) the first two Bills passed the Senate; and (d) each Bill was an amendment to one of the Acts of 1836.

The pertinent portions of these bills read as follows:

"And whereas doubts exist and difficulties may arise as to the jurisdictional rights of the State of Michigan and the Territory of Wisconsin over the islands in said Menominee River and in Green bay; now, for the purpose of defining with certainty the said boundary, and of giving effect to the same according to the true intent and meaning of the act aforesaid,

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the boundary line between the State of Michigan and Territory of Wisconsin shall . . . be established and confirmed as follows:

thence, down the channel of the Menominee, to Green bay; thence to *the main ship channel of Green bay, which passes on the western side of the islands situate therein;* thence along said main ship channel of Green bay, to the middle of Lake Michigan."

As members of Congress from Michigan construed the Acts of 1836 to mean that there was a ship channel in Green Bay which passed "on the western side of the islands situate therein," as the Judiciary and Territorial Committees of the Senate and the House of Representatives concurred in this opinion, as the Senate likewise adopted this view, and as the House of Representatives failed to do so only because of lack of time, it is clear that in 1935 the Supreme Court of the United States might safely accept this construction of the Acts of 1836. The history of this legislation is as follows:

(a) In the U. S. Senate on Dec. 14, 1842:

"Mr. Porter [U. S. Senator from Michigan], on leave, introduced a bill to amend an act entitled 'An act to establish the northern boundary of the State of Ohio, and to provide for the admission of Michigan into the Union,' approved in 1836; which was read twice, and referred to the Judiciary Committee" (*Congressional Globe*, Vol. 12, 1843, p. 50; see also *Journal of the Senate 27th Congress, 3rd Session*, p. 29).

Senator Augustus S. Porter's bill, referred to above, was designated as S 9. It provided for a Michigan-Wisconsin boundary in Green Bay which was to proceed from the mouth of the Menominee River "to the main ship-channel of Green Bay, which passes on the western side of the islands situate therein; thence along said main ship-channel, of Green bay to the middle of Lake Michigan, as further described in said act" [*i.e.*, the Act of June 15, 1836].

The use of the words "western side" shows that Senator Porter of Michigan considered in 1842 that there was a channel extending lengthwise of Green Bay in a north-south direction and that in 1836 Congress meant it to be followed by the Michigan-Wisconsin boundary.

(b) In the U. S. Senate on Jan. 17, 1843:

"Mr. Clayton [Senator Thomas Clayton of Delaware], from the Committee on the Judiciary, to whom was referred the bill (S 9) to amend an act entitled, 'An Act to establish the northern boundary line of the State of Ohio, and to provide for the admission of the State of Michigan into the Union, upon the conditions therein expressed,' reported it without amendment.

"Mr. Clayton also submitted a report on the subject, which was ordered to be printed" (*Journal of the Senate, 27th Congress, 3rd Session*, p. 110).

Senator Thomas Clayton's report, referred to above, quoted extensively from Captain Cram's report (*Senate Doc. 151, 26th Congress, 2nd Session*) regarding ship channels in Green Bay and then said:

". . . The bill referred to the committee disposes of these difficulties by making the western channel the boundary, which throws the islands in that bay to Wisconsin.

"The committee report the bill, and recommend that it pass" (*Senate Doc. 80, 27th Congress, 3rd Session,* p. 3).

The use of the words "western channel" shows that the Senate Committee on the Judiciary, whose chairman had himself participated in the passage of the Act of June 15, 1836, considered in January, 1843, that there was a channel extending lengthwise of Green Bay in a north-south direction and that in 1836 Congress meant it to be followed by the Michigan-Wisconsin boundary.

(c) The journal of the Senate shows (p. 231) that this Bill, S 9, was engrossed and read a third time on Feb. 27, 1843, and that it passed the Senate on Feb. 28, 1843 (*loc. cit.,* pp. 240–241). Thus the Senate as a whole formally concurred in the view that "the main channel of Green bay . . . passes on the western side of the islands situate therein."

(d) The journal of the House of Representatives shows that this Bill, S 9 was referred to the Committee on Territories on Feb. 28 (p. 477), and that on March 3 it was ordered that S 9 be committed without amendment to the Committee of the Whole House on the State of the Union (p. 570). Thus the Bill that recognized the existence of a channel of Green Bay on the western side of the islands, *i.e.,* extending northeast and southwest, far from being rejected by Congress, passed the Senate and merely got caught in the legislative jam of a March 3 when Congress adjourned.

(e) In the next Congress the same construction of the Acts of 1836 was again made by Congress. In the U. S. Senate on Dec. 15, 1843:

"Mr. Porter [U. S. Senator from Michigan], agreeable to notice, and on leave, introduced a bill to amend an act entitled: 'An act to establish the northern boundary line of the State of Ohio, and to provide for the admission of the State of Michigan into the Union, upon the condition therein expressed,' approved in 1836; which was read twice and referred to the Committee on the Judiciary" (*Congressional Globe,* Vol. 13, 1844, p. 37; see also *Journal of the Senate, 28th Congress, 1st Session,* p. 35).

Senator A. S. Porter's bill, referred to above, was designated as S 6. It provided for a Wisconsin-Michigan boundary in Green Bay which was to proceed from the mouth of the Menominee River "to the main ship channel of Green bay, which passes on the western side of the islands situate therein; thence along said main ship channel of Green bay, to the middle of Lake Michigan, as further described in said act" [*i.e.,* the Act of June 15, 1836].

The use of the words "western side" shows that Senator Porter of Michigan still considered in December, 1843, that there was a channel extending lengthwise of Green Bay in a north-south direction and that in 1836 Congress meant it to be followed by the Michigan-Wisconsin boundary.

The journal of the Senate shows that on Jan. 30, 1844, this bill was reported without amendment (p. 94), accompanied by a special report, No. 70.

(f) This report (*Sen. Doc. 70, 28th Congress, 1st Session*) repeats the statements of the Judiciary Committee of the previous Congress concerning the "western channel" showing that there was a northerly and southerly channel in Green Bay according to the Judiciary Committee's construction of the Acts of 1836. As the Bill was one to amend "An Act to establish the northern boundary line of the State of Ohio, and to provide for the admission of the State of Michigan into the Union," approved June 15, 1836, this item of evidence is singularly apposite.

(g) The Bill was engrossed and read a third time on Feb. 27, 1843 (p. 195). It passed the Senate on March 28, 1844 (p. 199).

(h) The *Journal of the House of Representatives, 28th Congress, 1st Session* shows that the Bill, S 6, was received from the Senate March 28, 1844 (p. 697), read a first and a second time and referred to the House Committee on the Judiciary on April 4, 1844 (p. 737); it was reported without amendment and committed to the Committee of the Whole on the State of the Union on April 17, 1844 (p. 804). Although this Congress likewise adjourned without passing the Bill it is significant that a fresh committee, the Committee on the Judiciary rather than the Committee on Territories as in the previous Congress, reported without amendment and recommended the passage of this Bill which showed that there was a north-south passage in Green Bay "on the western side of the islands."

(i) A third Congress, the second session of the 28th Congress, also approached the same conclusion. In the journal of the House of Representatives for Dec. 23, 1844, the following record appears:

> "In pursuance of previous notice, Mr. James B. Hunt [of Michigan] asked, obtained leave, and introduced a bill (No. 470) to amend an act entitled 'An act to establish the northern boundary-line of the State of Ohio, and to provide for the admission of the State of Michigan into the Union, upon the conditions therein expressed,' approved June 15, 1836: which bill was read a first and second time, and referred to the Committee on the Judiciary" (*Journal of the House of Representatives, 28th Congress, 2nd Session,* p. 134).

There was no unfavorable debate or report concerning this bill. It demonstrates a third successive conclusion by a member of Congress from Michigan that there is a north-south ship channel in Green Bay "on the western side of the islands."

Thus it is shown that the Special Master's desire to hold to the intent of Congress as a polestar is met by the actual records as to the views of (a)

a Michigan Senator in December, 1842, (b) a Michigan Senator in December, 1843, (c) a Michigan Representative in December, 1844, (d) the Senate Judiciary Committee in January, 1843, (e) the Senate itself in February, 1843, (f) the House Committee on Territories in March, 1843, (g) the Senate Judiciary Committee in January, 1844, (h) the Senate itself in March, 1844, and (i) the House Committee on Judiciary in April, 1844. Each of these nine indications of the intent of Congress was applied to an amendment of the Act of June 15, 1836. These records seem more apposite than the two letters of a former delegate of Michigan in Congress [see Report of the Special Master, page 43].

(7) The Supreme Court of the United States, moreover, had already construed the Acts of 1836 and determined that there is in the open body of Green Bay a northerly and southerly section of the ship channel. The decree of Nov. 22, 1926 (*272 U. S. 398*) provided for a boundary following "the most usual ship channel of Green Bay, passing to the north of Green island and westerly of Chambers island."

As Congress and the Supreme Court and the State of Michigan and the State of Wisconsin had all agreed that there is a northerly and southerly ship channel within the open body of Green Bay as well as an easterly and westerly ship channel at its entrance, it seemed clear, to the unlegal mind of a geographer at least, that the second of the Special Master's alternative boundaries (pp. 50–51) should be adopted. This was the one which would give Wisconsin a boundary in the geographical centre of Green Bay.

Most of these suggestions of its geographer, rephrased in lawyer's English, were utilized by Wisconsin in its briefs. Of course they included much additional material upon these and many other issues.

Wisconsin argued that the claim of *res adjudicata* does not apply (a) because mutual mistakes were made in the 1926 decree, (b) because the decree was entered by consent and was erroneous, and (c) because in the Michigan-Wisconsin boundary case of 1923–26 "the location of the boundary line in the waters of Green Bay was not in issue and was not adjudicated." She also asserted, *inter alia,* (d) that in 1926 the Michigan lawyer, himself resident on Green Bay, "dictated that portion of the decree which established a boundary through the Green Bay waters, and counsel for Wisconsin consented thereto, believing that said line followed a jurisdictional line which the court had instructed them to follow as outlined by counsel for Michigan," (e) that in addition to the three errors in the decree which Michigan admits there is a great mass of additional errors, (f) that all the official maps in the record including Michigan's own maps support Wisconsin's boundary claim, (g) that practically all the fisherman witnesses

from the Menominee River-Chambers Island area and the Rock Island Passage area supported Wisconsin's boundary claim, (h) that there was disagreement about this matter only in the Washington Island-Whaleback Shoal area, (i) that Wisconsin's claim that the centres of ship channels are vastly different from modern shipping courses is supported by international usage in treaties, citing the Maine-New Brunswick boundary in Passamaquoddy Bay and the Michigan-Ontario boundary between Lake Erie and Lake Huron, (j) that the geographical centre rule of law is the only proper one applicable to the situation in Green Bay, (k) that the boundary decree of 1926 was not in accord with the previous opinion of the Supreme Court which said that Wisconsin claimed a boundary turning north from the mouth of the Menominee and also said that "the claims of Wisconsin as to the location of the boundary in all three sections are sustained" (*Brief of Plaintiff, State of Wisconsin,* pp. 3, 15, 17, 18, 23, 26, 30, 51). It may not have been cricket, but two of Michigan's official maps which support Wisconsin's boundary claim were reproduced in Wisconsin's brief; so we reproduce one of them here (Fig. 5).

In her printed briefs Michigan also dissented from the Special Master's conclusion that there were no ship channels within Green Bay, independently confirming several of the points argued by Wisconsin. She also insisted strongly (a) that the whole matter, except for correcting three admitted errors, was *res adjudicata.* Among other things the defendant asserted (b) that Michigan would lose some $20,000 a year in non-resident fishing license fees from the Wisconsin fishermen of Washington Island and the towns south of the Menominee River if she were not awarded the water boundary claimed, (c) that in the Special Master's view Wisconsin had acquired no rights in the water areas by prescription, (d) that in Michigan's view the Supreme Court had "no jurisdiction to reconsider its determination except for the apparent errors, or transcriptional errors," (e) that neither State was entitled to any affirmative relief, (f) that since 1923 Michigan had been exercising jurisdiction in the waters claimed by Wisconsin, (g) that the existence of transcriptional errors "is not a ground for reconsideration of other matters involved in the [1926] decree," (h) that the Supreme Court referred in its 1926 decision to "two distinct ship channels" in the body of Green Bay east and west respectively from Chambers Island, (i) that "the Special Master's recommendations disturb the status as to sovereignty," (j) that Michigan officials patrolled the triangle of water off the mouth of the Menominee from 1912 to 1932 enforcing Michigan laws there with "some, if not complete success" thus proving Michigan's sovereignty, (k) that Wisconsin's special counsel, not Michigan's, had first suggested in 1926 that the dotted lines on the Lake Survey

charts be taken as the centre lines of the ship channels and therefore as the boundary then intended, (l) that the evidence regarding the replevined gangs of fishing nets in the straits west of Chambers Island was proof of Michigan's acts of administration there, (m) that the Special Master had "disregarded the findings of this court and their necessary inferences," as well as "gone beyond the pleadings and made findings of fact on matters not litigated before him," (n) that in 1926 "It was the intent of the court to leave the parties where it found them," (o) that "This court has established and no doubt will maintain a policy of non-aggression," and (p) that the 1926 decree of the Supreme Court ought to be clarified with respect to "the transcriptional errors resulting from mutual mistake" (*Brief of the Defendant,* pp. 18, 22, 29, 31, 34, 38, 39, 44, 67, 69, and 72). Michigan's reply brief denies several of Wisconsin's arguments and reiterates most of the points outlined above.

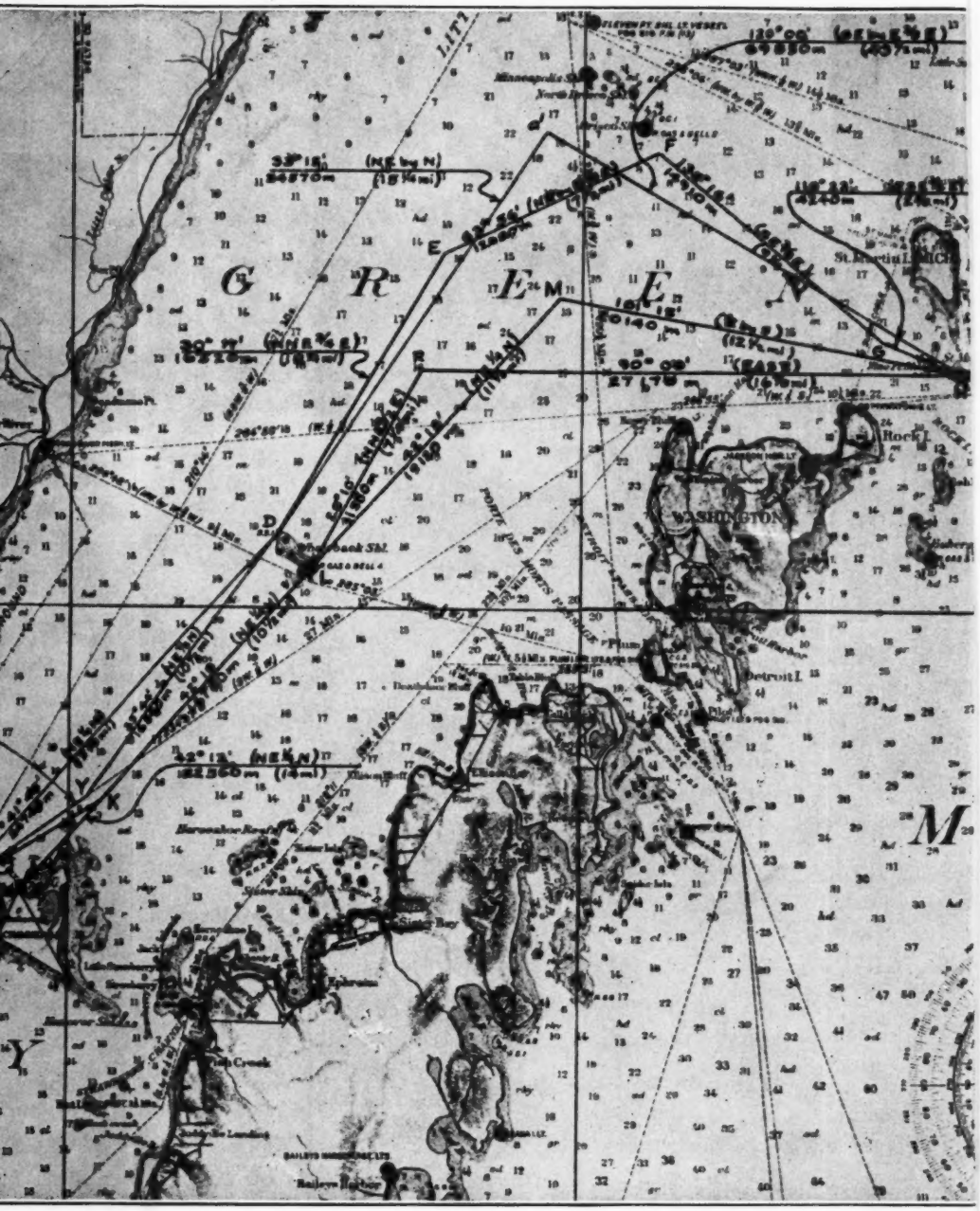
Verbal argument before the Supreme Court began on Feb. 11, 1935, but was adjourned after a few minutes because the members of the bench discovered that the record of testimony had not been printed. Argument was resumed and completed on April 8. The opinion came down on May 20. Among the outstanding features of the court's award were the following.

Michigan's claim of *res adjudicata* was denied in a simple sentence specifying that "The Master rightly concluded that the court has jurisdiction to correct the decree [of 1926]." Michigan was given Grassy Island, Sugar Island, and the triangle of fishing waters opposite Menominee and Marinette, reversing the Special Master's recommendation that the last-named area be given to Wisconsin. Perhaps chiefly on the grounds stated in the quotation printed at the head of this article, namely that Congress intended Wisconsin and Michigan to have equal right and opportunity in the waters of Green Bay, the court's opinion awarded to Wisconsin a boundary near the geographical centre of Green Bay, as suggested in the Special Master's second alternative. It was also specified that the State line should extend from a point west of the Rock Island Passage "easterly . . . to the boundary in the middle of Lake Michigan." The Special Master was directed to prepare and submit to the court a form of boundary decree giving effect to these decisions.

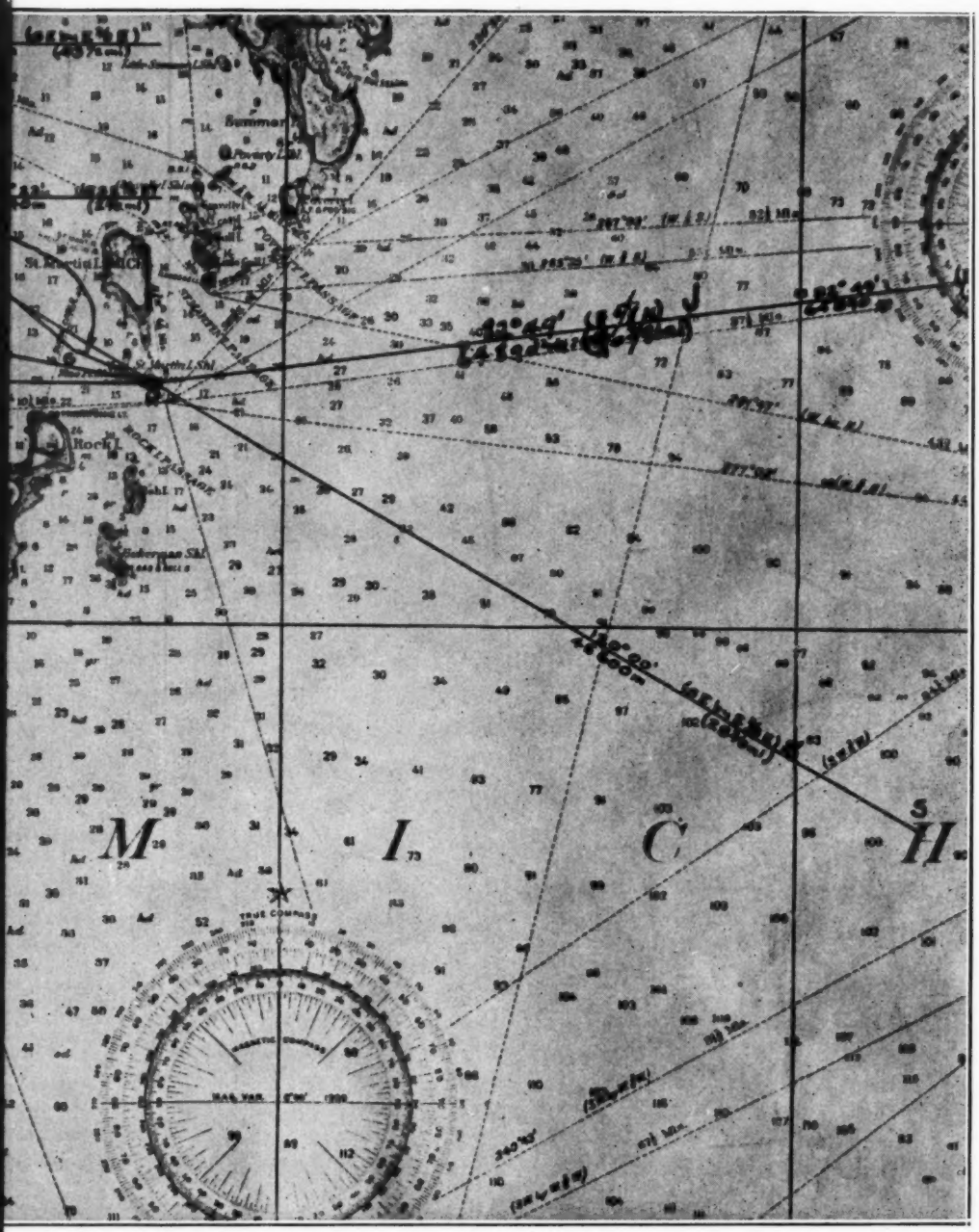
The Supreme Court's 1936 Decree.

Not least among the sagacious and sympathetic acts of the Special Master were the hearings on the draft decree. The witnesses who testified were locally informed and highly professional. They included a federal lighthouse superintendent who had been in charge of the district which in-

FIG. 12.—The Wisconsin-Michigan boundary in Green Bay and upper



y and upper Lake Michigan as fixed by the Supreme Court in 1936 together with other boundaries considered at heari



considered at hearings before the Special Master. The line established goes from A through B C K L R and H to S.

cludes Green Bay for 18 years, a federal civil engineer who had been stationed on Lake Michigan for 27 years, the State Geologist of Michigan, and an engineer from the Wisconsin Public Service Commission. With the Special Counsel of Michigan and of Wisconsin and these witnesses the Special Master worked out the most desirable position for the portions of the new State boundary near the geographical centre of Green Bay and Rock Island Passage. The Special Master's second or supplemental report giving the results of his hearings respecting the boundary decree, and the detailed boundary description, together with the briefs of Wisconsin and of Michigan commenting upon the Master's recommendations, were laid before the Supreme Court in due course.

Four outstanding features may be stated. Wisconsin was not given a boundary in the geographical centre of Green Bay but slightly east of it (Fig. 12). Her special counsel made a valiant final attempt to secure the small triangle of fishing waters opposite Menominee and Marinette and to have the boundary in the middle of Green Bay moved slightly to one of two other positions; he argued ably that it was unfair to cut corners where the east-west boundary west of the middle of Rock Island Passage met the north-south boundary north of Whaleback Shoal and then to fail to cut corners between Chambers Island and the mouth of the Menominee River, since these two things both gave additional fishing waters to Michigan and restricted Wisconsin fishermen's field of activity (Fig. 13).

Another outstanding feature was that the Special Master himself discovered the 36-mile gap between the end of the easternmost course in the new boundary and the northern terminus of the boundary set up by Congress in 1836 in the middle of Lake Michigan; he took from Wisconsin some 500 square miles of valuable fishing waters which his earlier report had recommended giving her, and awarded all but a little of this large triangle of water to Michigan. To this we must revert *infra,* "Infelicities in the Boundary Description," p. 121.

Michigan's final brief is one of the wisest, ablest, and most friendly legal documents that one geographer, at least, has ever read. It covers Wisconsin's objections adequately; it urges that the Special Master's recommendations for a decree be adopted *in toto;* it shows that the boundary is practical, that fishermen and law enforcement officers can find it easily since federal lights define several of its turning points. This brief also demonstrates that, the boundary war being over, Michigan as Wisconsin's nearest neighbor wants to go on being her best friend.

Following brief verbal argument on March 2–3, 1936, the Supreme Court closed the case by a final decree dated March 16 which carried out all the recommendations of the Special Master's supplemental report. The decree

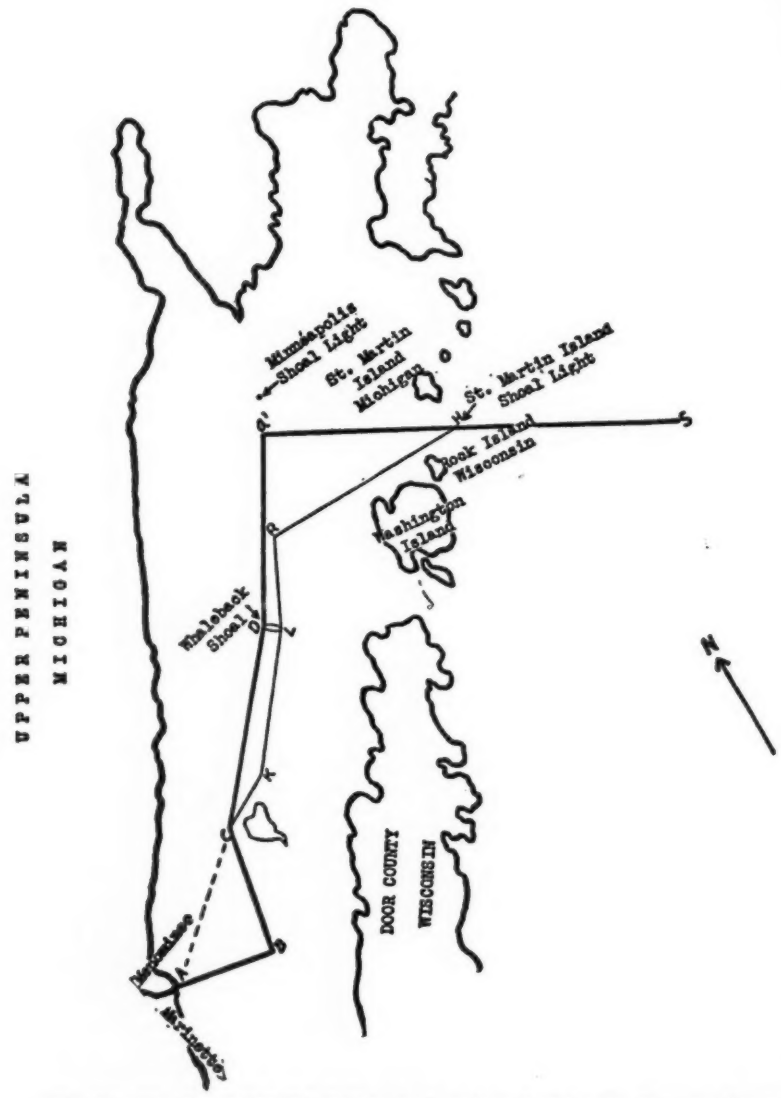


FIG. 13.—The line A B C K L R H is the boundary fixed by the Supreme Court in 1936. The line A C D a′ H S is the boundary urged by Wisconsin during the final stages of the Wisconsin-Michigan boundary suit of 1932–36 when she urged that, if it was unfair to cut corners east of the mouth of the Menominee, where it was disadvantageous to Wisconsin, that State should be given compensation through failing to cut corners west of the Rock Island Passage.

wisely restated the whole boundary description not only in the area involved in this boundary case of 1932–36 but also from Lake Superior to the mouth of the Menominee River as provided in the boundary case of 1923–26. By and large the new water boundary, except with relation to the small triangle of fishing waters at the mouth of the Menominee River, was essentially like the one suggested to the Attorney General of Wisconsin by a geographer in 1931. With the same exception noted above, it was totally unlike the one desired by Michigan from 1932 to 1936 which was unfair to the Wisconsin fishermen. The popularly-used local names of the turning-points in the new boundary are not mentioned in the decree but one of them is the lighted Whaleback Shoal in Green Bay and another is the lighted St. Martin Shoal in Rock Island Passage, as was suggested in the *Annals of the Association of American Geographers* in 1930.

But of course one's professional colleagues must understand that, as is right and proper, there is not a word either in the 1935 opinion or in the 1936 decree respecting these suggestions, or the publications and activities of members of the Association of American Geographers, or the origin of lawyer's knowledge of the errors in the 1926 decree.

INFELICITIES IN THE BOUNDARY DESCRIPTION

On the whole, the outcome of this boundary suit was admirable. Both States are satisfied. The fishermen have equal opportunity. The boundary is easy to find. To an inquisitive geographer, however, there appear to be several serious infelicities in the boundary description. These may be recorded in a series of good humored questions.

(1) Since Wisconsin proved up to the hilt that the first boundary course extending eastward from the mouth of the Menominee in the 1926 decree was not a direct line to the specified objective but, through a 1° error, was an indirect line which, sad to relate, was also three-eighths of a mile too long, since Michigan agreed and asked the Supreme Court in one of her briefs to change the boundary description to read "east by south one-eighth south" instead of "east by south," why in the world did the Supreme Court in the 1936 decree snip off the superfluous 1980 feet or $\frac{3}{8}$ of a mile of distance and then, omitting the words "one-eighth south," fail to correct the error in direction?

(2) Since no other legally or diplomatically determined boundary in the United States or at its frontiers, and probably no other boundary in the great, wide, wonderful, beautiful world, is described with its distances expressed partly in feet and partly in meters, why do you suppose the Special Master and the lawyers from Michigan and from Wisconsin let the Supreme Court describe the new boundary that way, as if the fishermen of

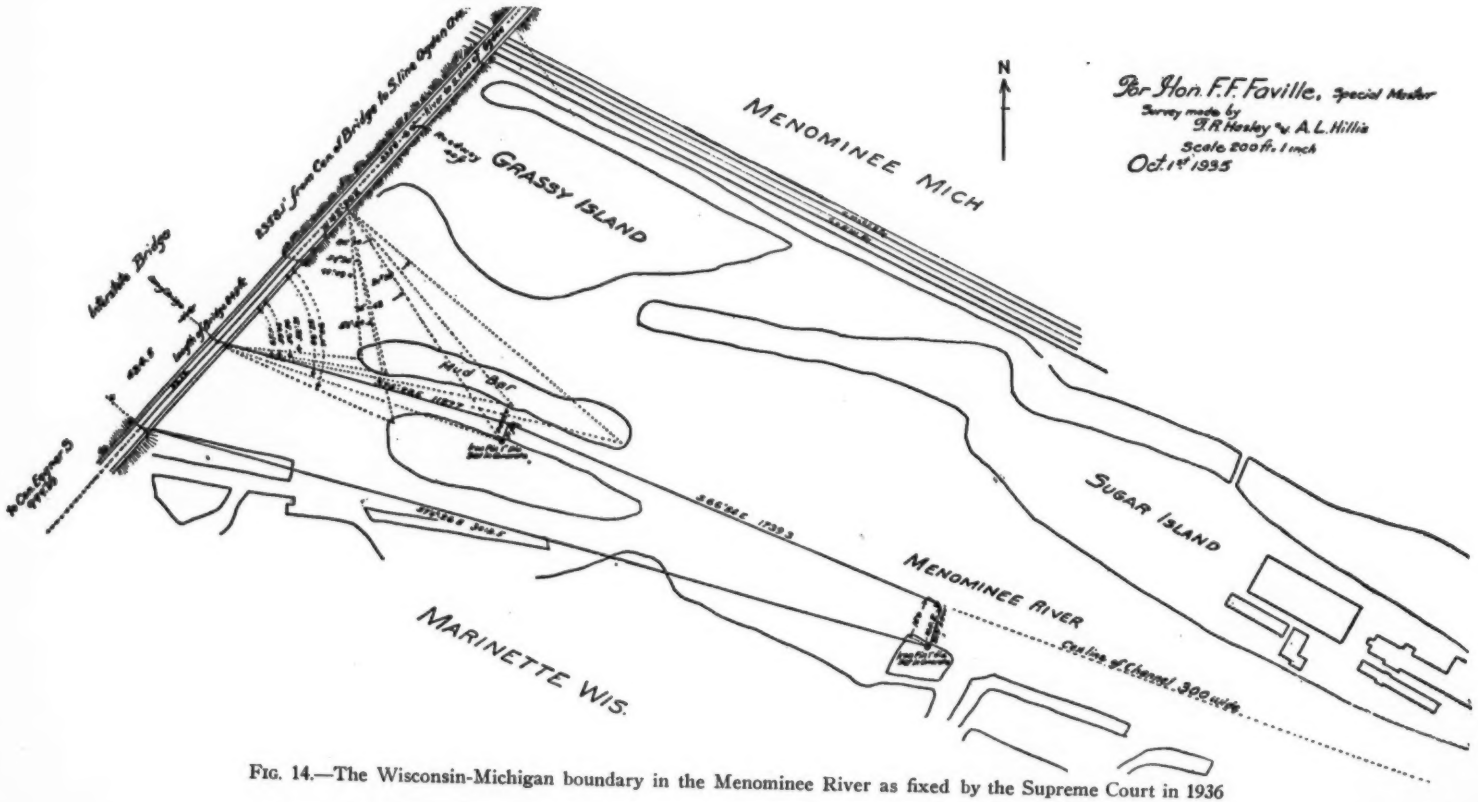


FIG. 14.—The Wisconsin-Michigan boundary in the Menominee River as fixed by the Supreme Court in 1936

Green Bay understood the metric system but the lumbermen of the Menominee River did not?

(3) For the same initial reason why should the directions of boundary courses within the Menominee River (Fig. 14) be expressed in what are technically called *bearings, i.e.,* units of less than 90° within quadrants—*e.g.,* "south seventy-four degrees and twenty-eight minutes (74° 28′) east"—while the directions of the boundary courses in Green Bay and Lake Michigan (Fig. 12) are expressed in the same court decree in *azimuths, i.e.,* units up to 360°—*e.g.,* "a true course of which the azimuth is one hundred one degrees and fifteen minutes (101° 15′)?"

(4) Since the distances along the successive courses of the new boundary in Green Bay and Lake Michigan are not small distances, actually ranging from 7⅛ miles to 28⅜ miles between turning points, since, although inchworms and fairies may do so, no grown man would think of measuring and recording the widths of streets or rivers in inches and say "it's 1200 inches wide" when he meant 100 feet wide, and since no one has previously described boundaries that way, why do you suppose the distances along the new boundary in Green Bay and Lake Michigan are set forth in meters—*e.g.,* "forty-five thousand six hundred (45,600) meters"—when kilometers are so widely used?

(5) Since courts and lawyers stress the necessity of always trying cases in the proper State or district or circuit, since the case of the 'Robert Holland' and 'Parana' between 1891 and 1896 demonstrated that no court knows exactly where the north-south Wisconsin-Michigan boundary in Lake Michigan really is (*Fed. Rep., Vol. 59, 1894,* pp. 200–201; Nickerson *v.* Bigelow, *ibid., Vol. 62, 1894,* pp. 900–901; *ibid., Vol. 70, 1896,* pp. 113–128), since a competent geographer has already published a map showing that the easternmost course in the new Wisconsin-Michigan boundary is so much too long that it crosses and projects more than 1½ statute miles, or some 2,500 meters, to the east of a line drawn northerly and southerly in "the middle of Lake Michigan" (Fig. 15), since it can be demonstrated that the direction of this final boundary course is so erroneous as to leave a gap or void of nearly 7 statute miles, or some 11,100 meters, between the north end of the Wisconsin-Michigan boundary fixed by Congress in 1836 and the east end of the Michigan-Wisconsin boundary fixed by the Supreme Court of the United States in 1936, since this inadvertence cannot be corrected by merely reducing the length of the final boundary course of 1936 which crosses the line in the middle of Lake Michigan north of the point where it ceases to be the interstate boundary of 1836, since the inadvertence as to the direction of the final boundary course deprives Michigan of a wedge of water nearly 7 miles wide at the east and about 28⅜ miles on a side, com-

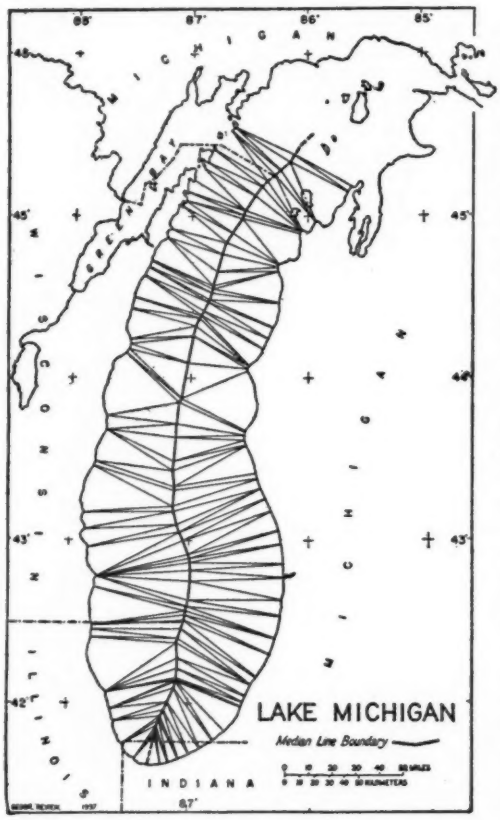


FIG. 15.—The new boundary between Wisconsin and Michigan as fixed by the Supreme Court of the United States on Mar. 16, 1936, shown by a line of dashes and dots. The boundary between the two States as determined by Congress on Apr. 20, 1836, shown by a full heavy line in the middle of Lake Michigan. The fine lines in the lake were drawn by S. W. Boggs in determining the position of the middle of Lake Michigan. Map reproduced from the *Geographical Review*, Vol. 27, 1937, p. 451, by permission of the American Geographical Society.

Observe (a) the new boundary *crosses* the line in the middle of Lake Michigan and extends several miles east of it, (b) the east end of the new boundary is not at right angles to the line in the middle of the lake so there is a gap of about 7 miles between the eastern terminus of the new boundary and the northern terminus of the boundary determined by Congress in 1836, (c) the north end of the line in the middle of Lake Michigan on this map, the Rock Island entrance of Green Bay, and a place southeasterly of the latter in the middle of the lake are the points of a triangular body of water, some 500 square miles in extent, which was awarded to Wisconsin in the Special Master's report of Nov. 12, 1934 (Fig. 7).

prising an area of almost 100 square miles—*in view of all this* would it not have been better if the final boundary course in the court's decree of 1936 had limited itself to the simpler words in the right-hand column below?

"Thence upon a true course of which the azimuth is one hundred twenty degrees (120°) for forty-five thousand six hundred (45,600) meters, the same being approximately southeast by east

Thence [*i.e.*, from the light on St. Martins Shoal] southeasterly to the boundary between the State of Michigan and the State of Wisconsin in the middle of Lake Michigan.

three-eighths east for twenty-eight and three-eighths (28⅜) miles to the center of Lake Michigan" (*297 U.S. 550*).

These are merely infelicities but, with the possible exception of the fourth one, they are serious ones. Perhaps the fifth question points to error, or to incompleteness; but let us call it an infelicity. In any event geographers will hope that infelicities, similar to the five lamentable ones stated in the foregoing questions, may not creep into future boundary descriptions by our great Supreme Court.

Lawyers, as it seems to a geographer, have not yet fully apprehended that our guild is a natural ally of theirs. The paper in the *Annals of the Association of American Geographers* for 1930, itself an exhibit in the second Wisconsin-Michigan boundary case, without doubt led directly to the boundary suit of 1932–36 and to the rewriting of the Supreme Court's 1926 boundary decree.

It is true that the geographer who wrote and published the 1930 paper had a great deal to do with the Michigan-Wisconsin boundary case of 1923–26, both as an expert witness and as a searcher-out of pertinent maps and geographical evidence of other sorts; it is also true that he never saw the boundary decree of 1926 until it was given out in printed form by the Supreme Court; but that paper was written, of course, for two reasons and only two.

Relatively few American geographers are associated with lawyers engaged in litigation either as expert witnesses or as professional advisers. It seemed in 1929 as if one's colleagues would be interested in the details of a specific job in applied geography. The other reason was that surprising errors in the boundary decree of 1926 made it necessary to reconsider and modify the decree; so the paper was published in the hope that it might be convenient, perhaps useful, to the judges and the lawyers when the inevitable reconsideration took place. The criticisms in the paper published in 1930 were neither "academic" nor "rather fanciful," as suggested in one of the briefs of the defendant; if they had been, the boundary decree of 1936 would not have resulted in the carrying out of essentially every one of the suggestions made in its text.

For exactly similar reasons five of the infelicities in the boundary decree of 1936 are described above in the hope of being helpful. One knows that judges and lawyers will not object to four generalizations by a geographer: (1) the errors in the Supreme Court's Michigan-Wisconsin boundary decree of 1926 should have been prevented by careful checking of the draft decree and therefore no Wisconsin-Michigan boundary suit of 1932–36 need have been brought; (2) there should have been no such infelicities in

the Supreme Court's Wisconsin-Michigan boundary decree of 1936 as are set forth above; (3) future boundary decrees should contain neither errors nor infelicities; (4) the way to avoid them is for judges or lawyers to consult a professional geographer when questions of geography are at issue.

RESPONSIVENESS OF THE SUPREME COURT TO ACTS OF CONGRESS AND TO THE NEEDS OF LOCAL COMMUNITIES

No geographer would think of closing his paper on the note of infelicity. The Wisconsin-Michigan boundary case of 1932–36 reveals once again our highest tribunal's responsiveness to the American people. The court always seems to accept cases between the States of the United States. The justices patiently hear them and in recent years, under Chief Justice Taft and Chief Justice Hughes, they have substituted for commissioners or ordinary masters, who merely heard and reported testimony, Special Masters who have power to report findings of fact, to state conclusions of law, and to make recommendations for opinions and decrees. This gives the States more time to present their cases and to argue them fully. Not seldom the Supreme Court uncomplainingly reconsiders the same case. A boundary suit between Washington and Oregon was heard twice, as was this boundary case between Michigan and Wisconsin; and different phases of the Maryland-West Virginia and the Massachusetts-Rhode Island boundary cases were before the Supreme Court for years and years. In boundary disputes, the court is notably attentive to the views of Congress, to the views of Congresses adjourned and gone these hundred years, but the court seems no more interested in litigation involving Acts of Congress, or great corporations, or great wealth and population than in the cases having to do with little people like the worthy fishermen of Green Bay.

Moreover, the justices demonstrate responsiveness and competence repeatedly by observing and taking account of the littlest things imaginable.[4] In 1936 they cheerfully annulled all that they were asked to reconsider in their own boundary decree of 1926, chiefly because it contained a superfluous word, a two-letter word, the next to the shortest word in English, the word *by*.

Washington, D. C.,
March, 1938.

[4] In 1934, while this boundary suit of 1932–36 was in progress, the justices of the Supreme Court applied their microscopes to the Webster-Ashburton treaty of 1842 and demonstrated that, when geography goes to court, there may be critical importance in something still smaller than the word *by*, namely in a *semi-colon* (*291 U. S. 138;* see also Hunter Miller, "A Point of Punctuation," *Amer. Jour. of International Law,* Vol. 29, 1935, pp. 118–123).

Studies of Land Occupance in the Vicinity of Dallas, Texas

The two papers which follow are presented as contrasting and yet supplementary studies of north central Texas. Both emphasize the significance of soil to land occupance.

"A Land Use Record in the Blackland Prairies of Texas," by Helen M. Strong, treats generally of the sequent occupance in the Black Waxy Prairies as a whole, before turning to specific cases of damage to soil in a small district northeast of Dallas incurred by the mode of land occupance prevalent during the past seventy-five years. The author concludes with an exposition of methods of improved soil management being introduced in an effort to check further deterioration.

"Influence of Contrasted Soil Types upon Changing Land Values near Grapevine, Texas," by Edwin J. Foscue, deals exclusively and intensively with a small district northwest of Dallas, an area which bestrides the contact between Black Waxy Prairie and the sandy soils to the westward. By comparison of land values as well as landscape features, the author contrasts the utilization of farmlands on the two sides of this critical line of contact in successive stages of their occupance. [Editor.]

A Land Use Record in the Blackland Prairies of Texas*

HELEN M. STRONG

THE RECORD OF LAND OCCUPANCE

By 1850 population began to spread sparsely over the entire blackland prairies of Texas (Fig. 1), although as early as 1834 settlers had been going out onto the timbered strips along streams because there they could obtain both wood and water. Uplands between streams were covered with a thick growth of native grasses, largely bluestems, some grama, and in some places the short grass or buffalo grass, locally known as curly mesquite. The country was a gently rolling unfenced range given over to cattle and horse raising, which was favored by the growth of luxuriant nutritious native grass, and climatic conditions that permitted cattle to be kept out of doors all the year around. Practically the only cultivated land lay along the valley bottoms where such food crops as corn and vegetables were grown in small fields.

With the coming of railroads in the 1870's, settlement was accelerated, but for a time continued to be principally along the rivers where cotton grown on the bottom lands became the chief cash crop of the region. With the advent of wire fencing in the late 1870's and early 1880's it became possible to enclose large areas of land. Then the upland blackland prairies were divided into fields, and cotton and other crops in large measure replaced the ranch live-stock industry.

By far the larger part of the cropped land in the blackland prairies has developed on Houston soils, which, consequently have been an important factor in the land use of the Black Prairie region. The Houston black clay is one of the most extensive soils in the blackland prairies and practically dominates the great dark soil region. Probably 90% of it is in cultivation, according to the estimate of the Bureau of Chemistry and Soils. The Houston soils are developed from material derived through disintegration of the underlying beds of the highly calcareous shales and limestones, such as Austin chalk, Eagle Ford shale, and Taylor marl. These are often locally called rotten limestone. The marls consist of very fine-grained limy clays containing 25% or less of calcium carbonate. The clay beds associated with

* This paper is based chiefly upon two field reconnaissance studies and source data in the regional office of the Soil Conservation Service at Ft. Worth, Texas.

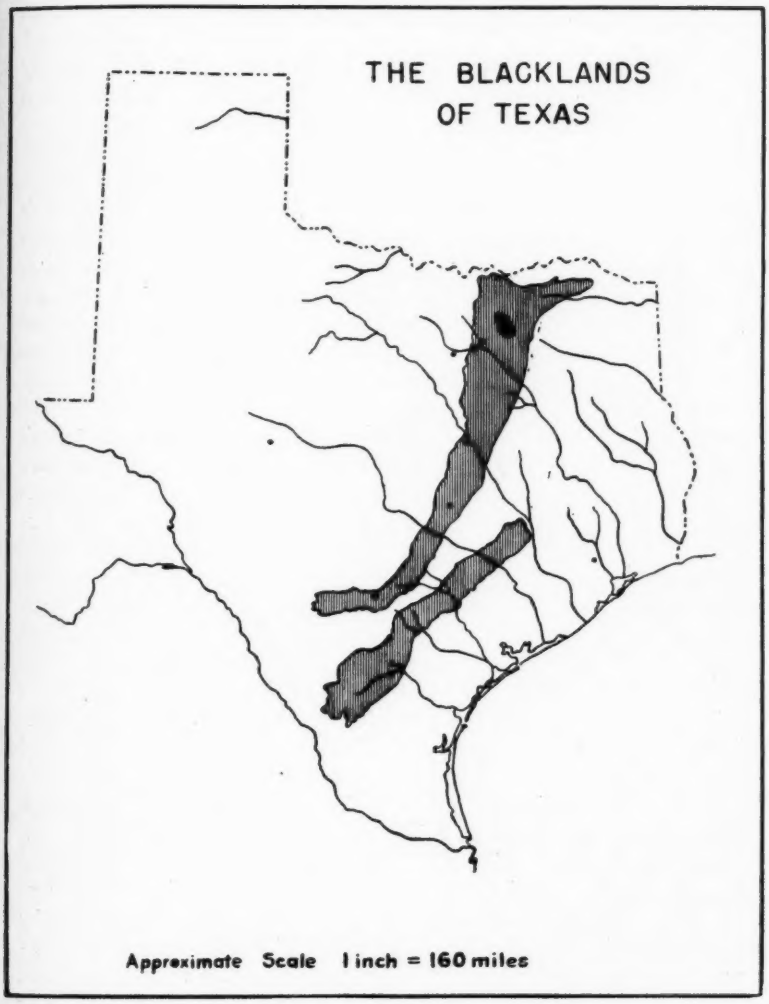


FIG. 1.—Outline Map of Texas, showing
Major streams.
Principal cities (small dots).
The Black Waxy Prairies (shaded).
The Garland Project of the Soil Conservation Service (solid black).

marl contain, usually, more or less calcium carbonate, but never less than the marl.

The characteristic Houston soils are black, with a profile imperfectly developed in all respects except color. The color profile has been controlled in its development by the very strong influence of the very high percentage of calcium carbonate in the marly parent material. The **A** horizon is from 12 to 20 inches in depth and consists of black calcareous clay which grades into slightly lighter colored heavy calcareous dark-gray clay. At a depth ranging from 3 to 5 feet, this material grades into the **C** horizon, which is a yellowish or yellowish-brown marl or, in some sections into a soft chalk or chalky marl. The **A** horizon is the fertile, productive, blackland soil. When this is eroded away, and cultivation attempted on the clayey **B** or marly **C** horizon, yields decline almost to the vanishing point, and the land is abandoned as far as crop agriculture is concerned. It grows up to weedy pasture of low feeding value.

When wet this soil has a waxy feel from which comes the name "Black Waxy Prairie." When dry it crumbles into fine pellets, so that the surface layer when cultivated becomes a friable loamy mass. During dry seasons the black topsoil cakes and cracks apart. Cracks several inches wide frequently appear down into the marl. The hard baked surface renders the ground impervious to moisture and is conducive to sheet wash, while the deep cracks frequently develop into gullies.

The theory is advanced that, because of the high percentage of calcium carbonate in the parent material of the Houston soils, and its disintegration to clay before the leaching out of the excessive calcium carbonate, these soils have not been good forest soils. Whatever the cause, the natural vegetation of this part of the clay belt was a heavy cover of grass, or grass and scattered trees.

The Houston soils in reality were the foundation of the agricultural development of the area. Through this grass cover they accumulated considerable organic matter, and, because of the high content of calcium carbonate, and the heavy texture of the soil material, from which the calcium was removed very slowly, the organic colloids were fixed, through saturation by the calcium, and were not removed from the soil by solution. The resulting accumulation of organic matter up to a relatively high percentage gave the soil its dark color. Calcium carbonate and organic matter also render the soil highly productive.

Their fertility and friable loamy texture were conducive to productive farming. They were adapted to cotton, the desirable cash crop of this region. Consequently, from the active development of crop agriculture to the present, cotton has formed the principal cash crop. Its acreage has exceeded that of any other crop, and, in some sections more than equals the

combined area of all others. Corn, next in order of importance was grown for feed for the livestock which had become a paying phase of the farm economy. Smaller proportions of the blackland areas were in oats and hay, and in early times, wheat.

Records show that definite systems of rotation were not generally practiced, owing to the high cash return from cotton, and to the belief that the deep fertile black soils could be cultivated continuously to cotton and maintain their productivity even without application of fertilizers. On many farms cotton, corn, or wheat was grown year after year on the same land. Yields declined, but few sensed the fact that the fertile black topsoil itself was washing off of their farms (Fig. 2). On many of the long gentle slopes, though no gullies formed, sheet wash with every heavy rain removed quantities of the fertile **A** horizon or topsoil. Considerably before 1933, soil surveys made by the Bureau of Chemistry and Soils mention the seriousness of this almost invisible sheet erosion on cultivated lands.

With cotton and corn, both clean-tilled crops, grown year after year on the same land without rotation, and with the furrows in many fields running straight up-and-down the slopes along the fence lines (Fig. 2), both

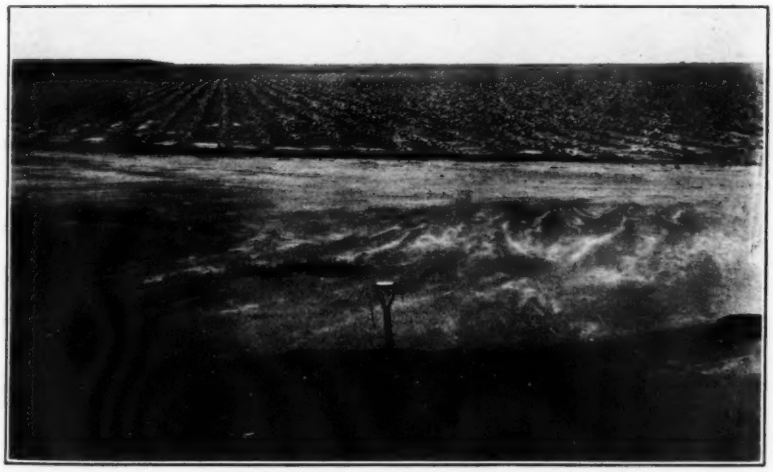


FIG. 2.—A typical blackland view, showing the long gentle slopes. Silt to a depth of 24 inches has washed from the rows of cotton which run up and down the hill. The shovel stands in front of an 8-inch cutbank of silt.

sheet wash and gullying have continued to take their toll of soil. Although the rainfall of the area is moderate, ranging from 17 to 59 inches a year,

high intensities result in much erosion. Based on a ten-year frequency, the intensity for a thirty-minute period of duration runs as high as 4.21 inches per hour. Add to this fact the slow permeability of the soil, and the excessive length of the slopes, and it is found that even on those of 2%, accelerated soil loss will be measured in tons, even in a single rain storm.

The length of the growing season, averaging 247 days (the shortest during a 21-year period was 218 days and the longest 280 days) favors cotton growing, but the character of precipitation presents difficulties for the farmer. The blackland prairie is far enough west to experience in some degree an uncertainty and variability in rainfall. To conserve moisture the ground is ploughed deeply so as to permit a maximum storage of water in the soil, and then given surface cultivation to conserve moisture during seasons of drought. The heavy soils of the region are also cultivated frequently to prevent them drying and cracking during hot dry season. This keeps the surface loose and dry, rendering it especially liable to heavy sheet wash and gullying.

Thus it is obvious that the land use which has been practiced from the settlement of the blackland prairies to the present day grew out of its climate, its soil types, and its land surface. These three factors, under the land use practices employed, have resulted in the soil erosion and soil conservation problems which present themselves today. Continuous planting to clean-tilled crops of corn and cotton on many fields has kept the soil bare. Numerous fields in the black belt now are mottled gray and black instead of being entirely covered with black soil (Fig. 3). Sheet erosion and incipient gullying are at work removing the topsoil, so that eventually the gray spots will expand to cover the entire area. Over large areas this has occurred. The productive black topsoil has been washed down the slopes and out through flooded streams to the Gulf, leaving only gray subsoil where once there had been a deep, fertile, black topsoil layer.

RECLAIMING THE DAMAGED LANDS

The history of past land use and attendant soil deterioration on a field near Garland provides a typical example of a widespread condition. There the topsoil has been washed off and the surface completely destroyed by gullies since it was first cultivated in 1876. This is typical of more than one field in the blackland prairie. The land on the slope was put into cultivation first, and five years later that on the upland. The growth of native grasses on the steeper slopes was not as dense as that on the more level land above, and the farmer, who possessed only two mules, found that they were not strong enough to break the heavier, tougher sod on the more level upland. The less dense growth of grass on the steeper slopes was broken

FIG. 3.—A field of mottled gray and black. On typical slopes such as this, the black topsoil is being washed away, exposing the gray subsoil in the incipient gullies.

by the two mules. Five years later, when the sod on the more level slope was broken, eight oxen were required to do the work. Even with this power a poor job of breaking was done, and a second breaking was required the next year before the soil was in proper shape for crop production.

Cotton and corn were the prevailing crops even on the steep slopes of this farm. Cotton made a bale to the acre the first year or two after it was cultivated. But due to continuous cropping to cotton and corn, and cultivation up-and-down the slope, the topsoil washed off. The yield declined until the land was abandoned in 1900 when it yielded only 100 pounds of seed per acre. It was allowed to remain idle until September, 1937, when it was sodded to Bermuda grass permanent pasture. During the period since cultivation the value of the land has declined materially. Not only has a 16-acre field been completely destroyed for cultivation, but a 10-acre field near the foot of the slope has been seriously damaged because large deposits of subsoil from the upper slopes have been deposited over fertile blackland. Gullies became a problem on this upland 16-acre slope in 1885, only four years after it was broken out of the native sod (Fig. 4).

Just across the fence from this badly gullied field is a permanent meadow, with the same degree of slope and the same soil type. The permanent native meadow grasses, namely Little Blue Stem, Big Blue Stem, and Side Oats Grama have conserved the soil to such an extent that there is

not the slightest trace of a gully on the slope or of sheet erosion over the entire field. In the early days the owner of this field had a large number of work stock and needed the hay from the meadow to feed his work stock. Therefore this field never was put into cultivation. The farm belongs to the family of the original settlers, and they have continued to farm the upland with their own work stock, and so have kept the slopes in permanent meadow, as a source of feed.

Farmers in the blackland prairies are becoming more conscious of soil loss. After black soil had accumulated to considerable depth in many shallow depressions, had buried fences, or had silted over the level land at the foot of long slopes (many of them 3000 to 4000 feet in length) and had filled many stock tanks, farmers began to realize that they were losing the fertile top cover of their fields. As early as the 1920's in a few cases, farmers attempted to stop this soil loss by terraces or various devices such as running ditches.

On the Garland project of the Soil Conservation Service near Dallas, Texas, is a field which 35 years ago was smooth and producing a bale of cotton to the acre. It began to gully 15 years ago, and now is being treated, after all the **A** horizon is gone, to hold the **B** horizon or subsoil in place, and produce a cover of grass on it to be used for pasture (Fig. 4).

FIG. 4.—A deep blackland gully which has been sodded and thus stabilized. The ungullied surface has been contour-plowed and planted to permanent pasture.

The long slopes present situations where terracing or contour plowing alone will not hold the soil and water. During even a light rain so much water accumulates on them that diversion terraces must be run across the upper part of these slopes to diminish the flow of water down slope. From

FIG. 5.—This steep slope formerly was in cotton with rows running up and down the hill. Erosion became so serious that it was abandoned for cultivation. The grass cover did not take hold well until contour ridges were run. Note grassed drainageways between the contour ridges.

FIG. 6.—Typical strip crops in the black lands. Strips of close-growing oats between strips of cotton tend to prevent soil and water loss on these long gentle slopes.

above these terraces water is carried into grassed outlet channels to be spread over fields, pastures, or woodlands (Fig. 5). During and after even a heavy rain, water runs through such grassed outlet channels crystal clear —conclusive evidence that there is no soil loss. Below the protective terraces, contour ploughing in conjunction with strip cropping holds the soil in place (Fig. 6), sometimes supplemented by additional terraces. Water thus stays on the land, to soak into the ground and keep the ground water reservoir replenished.

Many of the worn out fields in this region are being put over into pasture. If grazing is regulated the grass cover on them will be maintained, and stock raising thus may become a profitable industry. This, combined with cotton, will provide a broader base for the cash income of the blackland farmer.

Soil Conservation Service, Washington, D. C.,
February, 1938.

Influence of Contrasted Soil Types Upon Changing Land Values Near Grapevine, Texas

EDWIN J. FOSCUE

In northeastern Tarrant County, Texas (Fig. 1), near the town of Grapevine, the two lower members of the Upper Cretaceous system outcrop in parallel north-south beds. The strata dip southeasterly exposing the younger Eagle Ford shale along the eastern border of the county and bringing to the surface the underlying Woodbine sandstone immediately west of the shale (Fig. 2).

FIG. 1.—Location of the Grapevine Area.

The soils that have developed from these two formations contrast widely in appearance and composition. The shale constitutes the parent material for a black, calcareous, clayey soil, while the sandstone holds a similar relation to a reddish, non-calcareous, sandy and stony soil. The contact between the formations is clearly marked by a change in soil color and an equally striking contrast in natural vegetation. In their virgin condition the calcareous, clayey soils were occupied by tall prairie grass studded with scattered clumps of mesquite trees; the non-calcerous, sandy soils were heavily timbered with post oaks and black-jack oaks.

SOIL TYPES

Most of the Grapevine Prairie, overlying the Eagle Ford shale, is covered with the Houston black clay, a stiff, black, plastic, high lime soil. More than 90 per cent of the soil type is under cultivation.

The cross-timber belt on the Woodbine formation is mantled largely with Kirvin fine sandy loam, a light reddish brown soil, low in lime. Hill tops are decidedly gravelly, small patches having so much fragmented ferruginous stone as to handicap cultivation. Other sandy soils in the cross-timber include the Leaf and Tabor fine sandy loams, types similar to the Kirvin.

Aside from contrasts in soil character and in natural vegetation, the physical environment differs little on the two sides of the area. The land

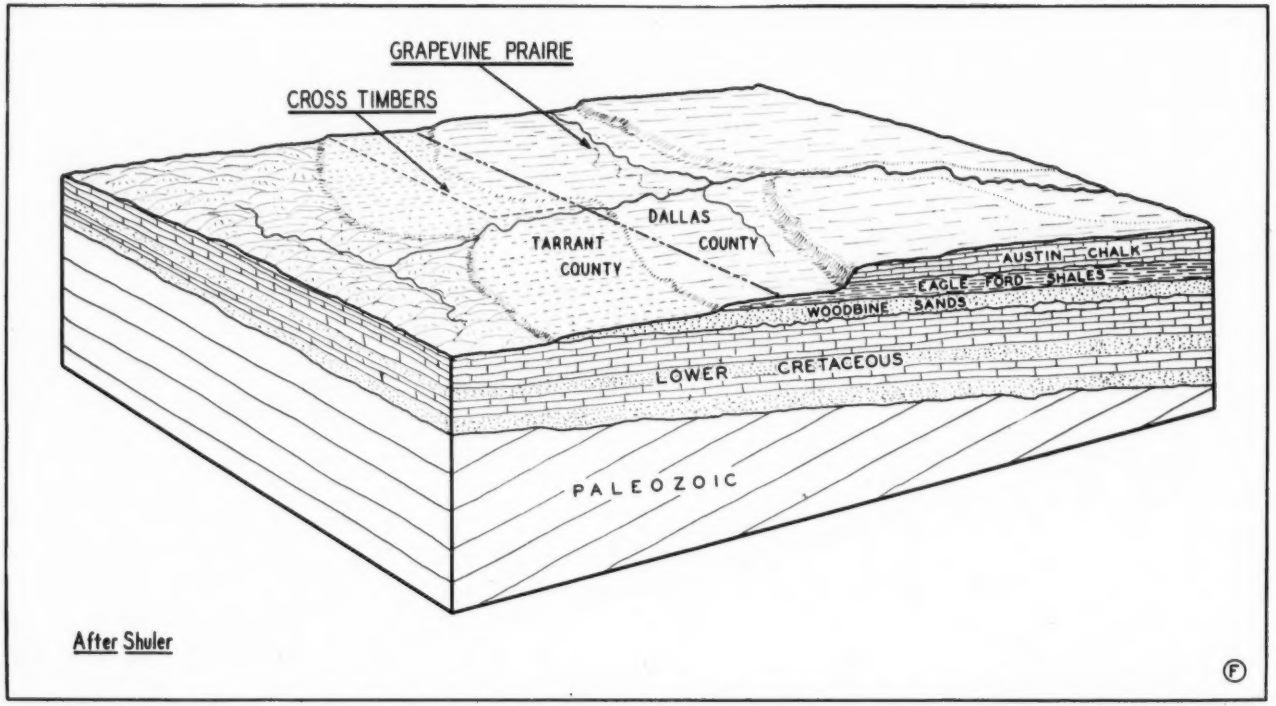


FIG. 2.—Block diagram of a portion of Tarrant and Dallas counties showing sub-surface structure and its influence upon relief and soil types. Broken line represents county boundary; dotted lines, the boundaries of the Grapevine area.

slopes gently to the east and is dissected by several small tributaries of the Trinity River. Variations in relief throughout the area result wholly from erosion by surface streams. Decrease in precipitation from east to west is not sufficient to produce any variations in land use and land values. Why, then, are there such marked cultural contrasts between two parts of this area? The answer lies in relative agricultural values of the two soil types on opposite sides of the Eagle Ford-Woodbine contact.

SETTLEMENT OF THE AREA

The first settlements in Tarrant County established themselves between 1835 and 1840 during the period of the Texas Republic. Tarrant County was created by the Legislature of the State of Texas in 1849, with the county seat at Birdville, a small settlement on the western margin of the Cross Timbers. Early settlement in the county was retarded by the Cherokee Indians, who at one time had a village in the Cross Timber comprising about one hundred dwellings. Following their removal to the Indian Territory in 1873, white occupance proceeded rapidly.

The first folk who settled in the northeastern part of Tarrant County invariably homesteaded by choice in sandy, timbered lands, rather than on the black, "waxy," treeless prairie. They preferred the sandy lands because: (1) timber offered some protection from Indians and also supplied wood for fuel and for houses; (2) sandy soils were more easily cultivated with the farming implements they possessed than were the "waxy" soils; (3) farmsteads in the sandy areas were not marooned by sticky mud and standing water in wet weather as were those on the heavy prairie soils; (4) surface springs were more abundant in the sandy lands; and (5) most pioneers believed something was wrong with prairie soils that would not grow trees. Consequently most of the sandy, timbered area was occupied before the prairies received their first settlements, even though the pioneers had to cross the grass lands to reach what they considered the better soil types in the timber.

When later settlements were made in this area, most of the timbered, sandy lands were already occupied, and the new comers had to be content with prairie lands, now more favorable for occupancy because good water, in the Woodbine sands underlying the Eagle Ford shale, could be secured through modern bored wells. The presence of an adequate supply of artesian water at shallow depth enabled each farm on the prairie to have its own water supply, despite the lack of hillside springs. Prairie soils, that had been considered worthless by the early settlers, soon proved to be the most valuable land of the area, particularly when farms began to produce, on an extensive scale, cotton, corn, and wheat for the rapidly growing

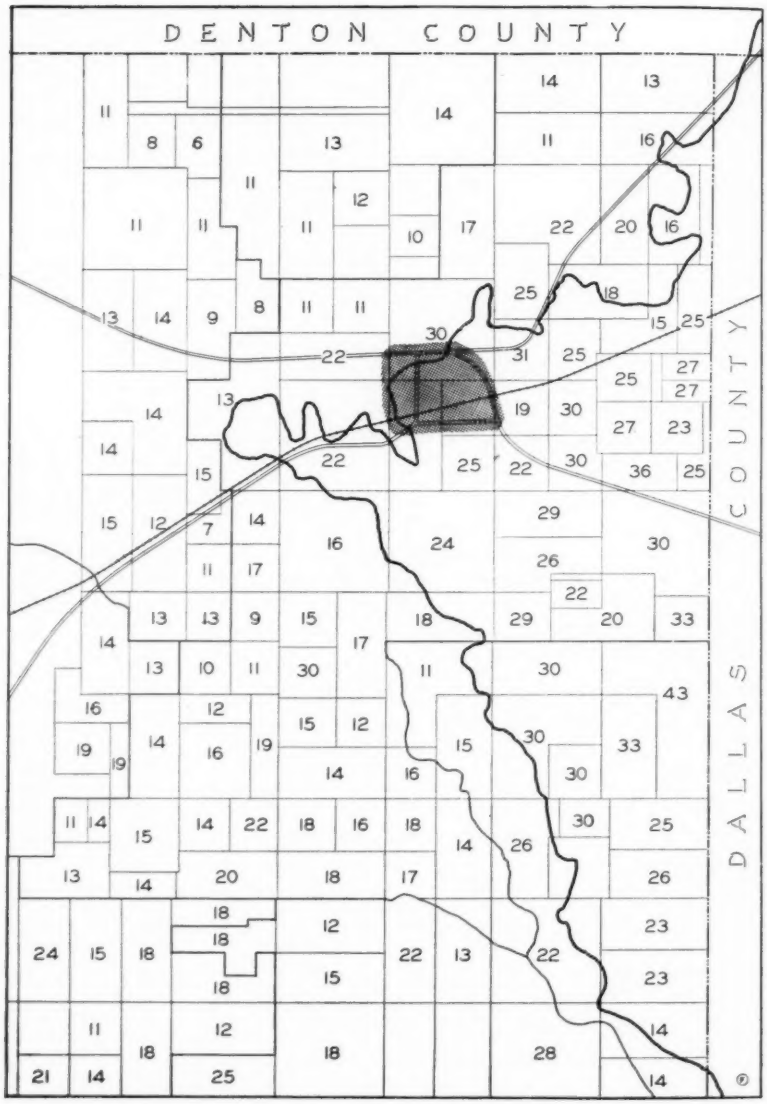


FIG. 3.—Land value map of the northeastern part of Tarrant County. Figures represent assessed value in dollars per acre, approximately 50 per cent of actual value. Heavy line shows contact between the sandy soils of the Woodbine forma-

markets of north Texas. The fertility of the prairie soils proved to be much greater than that of the sandy soils.

LAND VALUES

To determine the obvious differences in land value on the two sides of this area, the writer constructed a map to reveal any contrasts that might appear. The data for the map of land values (Fig. 3) were secured from tax rolls in the Tax Assessor's Office at Fort Worth and represent approximately 50 per cent of the actual values. Since assessments include improvements on the farms, marked discrepancies sometimes appear, but when allowances are made for special improvements on some farms, the map shows clearly that farms in the treeless prairie average approximately twice the value of those in the cross timber. Land value data, shown on the map by figures, represent assessed values in dollars per acre, by original headright surveys, as levied upon to support county and independent school districts. Lands included within the village limits of Grapevine have not been considered, since contrasts in soil types have little influence on the value of urban property.

LAND USE

The Timbered Sandy Lands. In the sandy areas the farms show their age in the general appearance of the farmstead and its equipment. Some houses, although dilapidated and badly in need of repairs and paint, show signs of a former elegance, reflecting farm prosperity brought into the area from elsewhere and not produced locally. Most houses, built in the later part of the 19th Century, display an ornate architectural style characteristic of the late Victorian era (Fig. 4). Farm equipment, frequently in a poor state of repair, is somewhat antiquated. Most farms seem to have passed the zenith of their development and are on the decline.

Specialized dairy and poultry farms (Fig. 5) and farm-estates of the city dweller have recently entered the timbered, sandy soils and are succeeding. The sandy soils can be made to support good grass for dairy cattle, and the proximity of the area to Dallas and Fort Worth provides easy access to markets. Some of the best developed of the "estate" type of farms are shown in figures 6 and 7.

The Prairie Lands. In spite of the fact that lands are more valuable, farm houses on the prairies in many places show lack of care and, although newer than those of the sandy area, are not so well built (Fig. 8). This

tion to the west, and the clayey soils of the Eagle Ford shales to the east. Note land values in the clay soils are approximately twice that of those in the sandy lands. Shaded area represents urban property within the village of Grapevine. (Parcels in the northwest corner are disputed with the adjacent county, and comparable tax figures are not available.)

FIG. 4.—A farm house in the sandy lands—substantial, almost elegant, but in need of repair and paint.

FIG. 5.—Modern dairy farm in the sandy area.

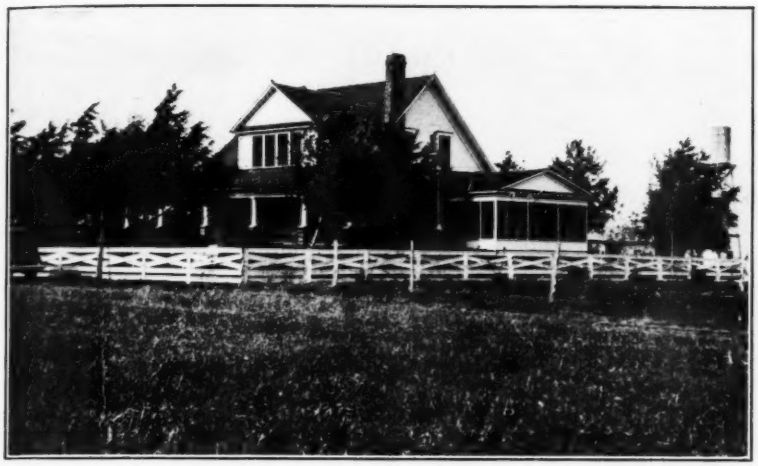


FIG. 6.—Modest farm estate in the cross-timber.

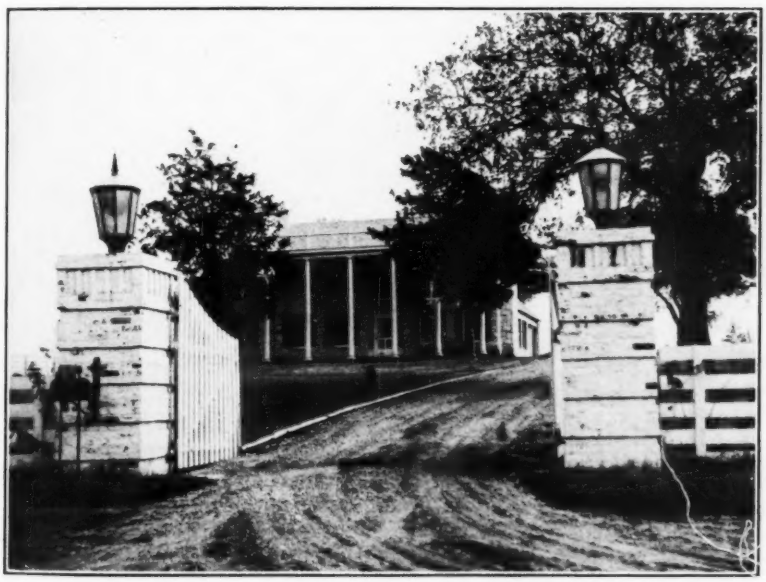


FIG. 7.—Extensive farm estate built in the timbered sandy lands.

FIG. 8.—The monotonous expanse of black prairie without trees does not attract the farm estate. Land, largely in cotton, is cultivated by tenant farmers who live in new but small unattractive houses.

apparent paradox is due doubtless to the fact that many prairie farms are operated by absentee owners who live in Dallas or Fort Worth and rent their farms to tenants. Some houses, although in better repair, do not show the former elegance and culture of homes of the sandy areas. The nature of the prairie, with its absence of trees, has failed to attract the farm-estate that the urban dweller establishes. The prairie lands are almost entirely in crops, producing chiefly cotton, and in minor quantity, corn, oats, and wheat. Farms are large and the landscape monotonous.

FUTURE OF THE TWO AREAS

It is somewhat hazardous to forecast the future land use in the two contrasted areas. Continued growth of Dallas and Fort Worth should cause some of the sandy areas, which at present have the lowest land valuation, to become the most valuable land, when developed by money brought from urban centers to establish dairy farms, poultry farms, or estates. The land-value map of the sandy lands will continue to show a spotted appearance due to physical improvements on some farms and lack of improvements on others. On the other hand, the prairie lands should maintain their present value and possibly increase somewhat. Their value, being vested more completely in the income producing worth of the land, will be more nearly uniform throughout the prairie area. These grass lands will not invite city dwellers to establish farm estates there, but they will attract ownership, in increasing measure, on the part of the metropolitan resident who operates his property by subletting it to the tenant farmer.

Southern Methodist University,
February, 1938.